Remarks
ON
SOME POINTS IN THE TREATMENT OF GASTRIC ULCER.*

BY

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THE treatment of gastric ulcer has, during the past few years, probably given rise to more discussion than that of any other single disease, and many different lines of treatment have been advocated. It is, therefore, obviously impossible for me in the short time at my disposal to criticize all the different views which have been held. I shall only be able to touch upon a few points in the principles of the treatment in so far as they are affected by the little that we know of the pathology of the disease.

Series of cases treated by different methods are continually being published in order to demonstrate that this or that treatment results in the greatest number of cures. Thus gastric ulcer has been treated by starvation, by immediate feeding, by olive oil, gelatine, and other drugs, with or without external applications, and modifications of each treatment have been adopted by different physicians. In each case the advocate claims that his own method gives the best results. In some cases the average time spent in bed is shorter, in others relapses of bleeding are less common, in others again the average loss of weight during the treatment is less than occurs when other methods are employed.

Very few take into account the subsequent condition of the patient with regard to relapses of the symptoms. This discrepancy indicates that collections of cases of this sort are of relatively little value in comparing the efficacy of various modes of treatment. There are several reasons for this. The diagnosis of gastric ulcer presents great difficulties, and in a large number of cases is impossible. The disease is very variable, both with regard to the condition of the ulcer, its position, extent, and external adhesions, the associated gastric disturbances of motility and secretion, and the condition of the gastric mucous membrane with regard to the presence or absence of gastritis. Acute and chronic ulcer are usually not distinctly separated by the observer. The constitution of the patient must also be taken into account. As in health there are individual idiosyncrasies of diet, so in disease a diet suitable for one patient may be unsuitable for another.

I do not wish to imply that all the different treatments are purely empirical and that the statistics merely represent attempts to find out what a treatment selected at random is worth, because each treatment is apparently based upon one or more points which the originator considers to be of special importance in the pathology of gastric ulcer. But I wish to point out that this method of collecting and publishing statistics of cases leads to erroneous results, because different classes of cases which cannot be compared with each other are apparently mixed together. Each case must therefore be studied individually, the pathological conditions present first determined as exactly as possible, and the case then treated according to one or two general principles founded upon our knowledge of the pathology of gastric ulceration, suitable modifications being introduced at the discretion of the medical attendant to meet the requirements of each patient. I am sure that better results will be obtained in this way than if a special "cure" be adopted and applied indiscriminately to every patient as directed.

I will first indicate what conditions the physician is called upon to treat and how such conditions may be recognized.

We must first distinguish acute from chronic gastric ulcer. It is very probable that chronic gastric ulcer arises from the acute variety, because occasionally transitional conditions between the two may be found. For instance, acute gastric ulcer may be considerably delayed in its time of healing, and it may also gradually extend. The records of such cases are difficult to collect, because the patients do not as a rule die, but it cannot be denied that there is a fair amount of evidence in favour of this view. Acute gastric ulcers vary in diameter from about the size of a split pea to an inch. They come before the notice of the physician either whilst they are in process of formation or when they are healing, and in either case profuse bleeding may occur. In fact an acute ulcer may be almost completely healed whilst bleeding from an open artery in the centre continues. It may be the original artery which was opened up during the formation of the ulcer and has continued bleeding, or it may have been opened later as the result of digestion of the centre of the base of the ulcer whilst the edges were healing. Acute ulcers are often called superficial erosions because they not uncommonly look quite superficial, although they extend down to the muscular coat. This is not to be wondered at considering that the thickness of the moderately stretched stomach is only about 4 mm. and the mucous membrane 1 mm. They are also often called fissures, because during healing an acute ulcer tends to contract up and form a radiating or a small depressed fissure-like scar.

An ulcer in the living stomach may look like a fissure and when slightly stretched assume the usual rounded form.

The tendency of an acute ulcer is to heal rapidly as in animals in a few weeks, and also to recur at intervals in the same individual. Such acute ulcers may quite commonly be diagnosed from chronic gastric ulcer, but, as in the case of most other diseases, the diagnosis may be quite impossible.

Acute gastric ulcer is commonly often latent and gives rise to no symptoms. Otherwise it announces its presence in one of three ways: (1) By a sudden perforation. (2) By sudden and profuse haemorrhage. (3) By pain and vomiting, with or without haemorrhage. As the ulcers tend to heal quickly, the symptoms last a proportionately short time.

The usual history of a *chronic* gastric ulcer is one of long-standing indigestion, with attacks of pain, vomiting, and haematemesis at intervals.

Since acute ulcers tend to recur in the same individual, the recurrences are usually diagnosed as relapses of chronic gastric ulcer, but attention to the following points will settle the diagnosis in many cases. There is no *one* point of distinction, so that the whole group of symptoms must be carefully studied. The pain is not so severe as in chronic ulcer, and it is not so commonly paroxysmal and independent of food, neither is it so liable to be continuous. Vomiting is commoner in the chronic form. Haematemesis in the acute disease is more liable to be profuse, to commence suddenly, and to cease suddenly. Hyperacidity occurs frequently in chronic ulcer; in acute ulcer the few estimations which have been made indicate that the acidity is normal or diminished. My own experiments on animals show that when an acute ulcer is in process of formation the acidity is diminished, but when it is healing the latter becomes normal. Wasting is only seen in chronic ulcer. Very long intervals between the attacks are in favour of recurrences of acute ulcer. Diminishing lengths of the intervals, and finally a condition of more or less constant pain and vomiting, are characteristic of a chronic ulcer.

Absolute freedom from symptoms during the intervals is in favour of acute ulcer, and the presence of some form of indigestion in favour of chronic ulcer. Of course the symptoms of indigestion may occur from time to time in a normal person, and they often precede the symptoms of an acute ulcer, but this point is certainly of value when taken in conjunction with others. Even though absolutely free intervals occur in chronic ulcer, it will often be found that the patient is unable to eat a full diet, and only keeps well by living on milk, eggs, and fish. In intervals between acute ulcers the patient can more often take any diet with impunity.

Acute ulcer is commoner in the young, and especially in women, although no age is exempt. Finally, transitional cases occur in which the patient may or may not have had a previous attack, but the duration of the symptoms

*Read before the Therapeutical Section of the Royal Society of Medicine.

is prolonged. Such cases are instances of acute ulcer, the healing of which is delayed or which is extending. Unhealed ulcers have been found more than two and a half months after the burns which caused them have healed, and many cases are recorded in which acute ulcers following burns have only given rise to symptoms some weeks after the burns have healed. The point I wish to emphasize is that at one end of the scale is acute ulcer, which usually heals rapidly; that at the other end is chronic ulcer; and that between the two are ulcers which, beginning acutely, heal slowly, or gradually extend, and some of which become chronic ulcers.

I should like to point out that the healing of acute ulcers may cause considerable deformity of the stomach, and that the character of the scar depends upon the size of the ulcer and the time it takes to heal, so that many scars which have been said to be those of chronic ulcers in the past have probably been those of acute ulcers, or of acute ulcers the healing of which has been delayed. I have gone into these points somewhat at length to show the great importance of acute ulcer, which I believe to be much commoner than is usually taught, and also to emphasize the fact that the more normally and the quicker an acute ulcer heals the less likely are there to be left those sequelae which necessitate surgical intervention.

Treatment of Acute Ulcer.

When an acute ulcer *perforates*, the case, by common consent, should be handed over to the surgeon at the very earliest moment, and success in the treatment of this condition must largely depend upon recognition of the earliest symptoms of perforation. *Haemorrhage* from an acute ulcer is, in my opinion, one of the most important conditions the physician is called upon to treat, and it is so common in this disease and so often the only symptom that it constitutes a definite type of the malady. It may or may not be possible to diagnose whether the ulcer is in process of formation or is already healing by the time at which haemorrhage has occurred during the course of the attack, but I do not think that this is of so much importance since the haemorrhage has to be primarily treated. Haemorrhage from an acute ulcer which is at all profuse is always due to perforation of an artery. The sudden cessation of the haemorrhage is due to plugging of the vessel with a clot. This clot may be interfered with by one of three factors: (1) The condition of distension of the stomach, which opens up and stretches the ulcer; (2) the alternate contraction and relaxation of the muscular coats of the stomach, which mechanically dislodge the clot; (3) the gastric juice, which digests the clot. Whether the clot be loosened or disintegrated, the blood pressure brings on a recurrence of the bleeding. Sometimes the wall of the artery may project almost beyond the level of the muscularis mucosae, and then the clot protrudes into the cavity of the stomach.

Such a condition is due to the movements of the stomach and the pressure of the blood in the artery. The aims of treatment in such cases should be: (1) To keep the stomach in the contracted state, (2) to prevent movements of the organ, and (3) to keep the digestive glands in the resting condition. In conditions where smaller amounts of blood are lost it must be impossible to say whether the bleeding is from smaller arteries, veins, or merely capillaries; but I think that in all these cases the same treatment should be employed. The patient should be kept at absolute rest in bed in the supine position and not allowed to move a muscle. Morphine should be subcutaneously administered in all cases of severe haemorrhage to assist in keeping the patient quiet. The mouth is to be thoroughly cleaned, and pain, if present, treated by morphine, and ice to the epigastrium. For the first twelve hours no feeding is attempted, but after this time has elapsed rectal feeds are started, consisting of peptonized milk and glucose every six hours, the rectum being washed out each morning. When the bleeding has been stopped for three days, mouth feeding is commenced and the rectal feeding discontinued. By stoppage of bleeding I mean not only absence of haematemesis, but also of fresh melaena, because as long as fresh melaena is present active bleeding is going on. A simple enema is given every other day as soon as mouth feeding is commenced, and at the end of a week saline aperients are commenced. I have never seen a case of parotitis occur if the mouth be kept properly clean.

I do not employ rectal feeding in gastric ulcer in any other condition, because it means that the patient is on a starvation diet; but I think at all costs the stomach must be kept at absolute rest in the case of bleeding from an acute gastric ulcer, and it is not necessary to employ the method longer than for a few days. The time is usually so short that I hardly think it necessary to employ the subcutaneous method of feeding with blood serum or other substances. In this way the stomach is kept in the resting condition both with regard to movement and secretion. It has been stated and also denied that rectal feeding causes a flow of gastric juice. I think it is, at all events, likely that the blood in the stomach causes some secretion of gastric juice, and to overcome this difficulty I have allowed the patient to frequently drink lime water by teaspoonfuls. This alkali is preferable to sodium bicarbonate, which distends the stomach by liberation of carbonic oxide gas. The alkali neutralizes what acid is in the stomach and does not encourage further secretion. The movements of the stomach which are set up by this fluid must be minimal.

In four cases within the last few months at University College Hospital the haemorrhage of acute ulcers relapsed on commencing mouth feeding and led to the death of the patients. According to Lenhartz,[1] when feeding is started by mouth at once recurrence of bleeding only occurs in 6.4 per cent. of patients, but I do not see how it is possible to collect a series of cases in which haemorrhage is occurring under the same conditions. The giving of food by the mouth neutralizes what acid is present in the stomach, but it excites further secretion, and as a fact there is always in contact with the stomach wall a layer of freshly-secreted gastric juice which is about to soak into the food. This can be shown by giving a meal soaked in alkali. Although the main body of the food is strongly alkaline there is always a layer in contact with the stomach wall which is strongly acid in reaction, and this layer gradually deepens until the whole has attained the normal acidity. A digesting stomach is therefore in a condition to disintegrate the clot which is blocking the artery.

Muscular movements are also excited by food and these tend to dislodge the clot.

The icebag of Lenhartz, if it has any influence in diminishing the movements of the stomach, must thereby cause stagnation of the stomach contents, and a more prolonged action of the digestive fluids upon the clot. I believe that when the bleeding is slight mouth feeding could be commenced at once, but it is impossible to be sure of the size of the vessel, because in a case recently under my care a fair-sized artery was opened, and yet the patient only had coffee-ground vomit, so that I make the rule that in all cases of haemorrhage food should not be administered by mouth.

One cannot be altogether guided by statistics, when one sees actual cases in which bleeding breaks out two or three days after the administration of food. On the other hand I do not state that the patient never dies if fed by the rectum. My own experiments show the importance of the condition of the gastric glands upon the production of gastric ulceration. If the gastric juice be put out of action, ulceration fails to occur. If the stomach is digesting, ulceration produced in it is more marked than when the organ is resting. The presence of food in the stomach must, therefore, be harmful to a newly-formed clot. It is conceivable that the gelatine treatment of Senator might be of advantage if the bleeding came from the capillaries or small veins, but hardly in the case of serious bleeding from an artery. It does not appear to have found many advocates in England.

The older physicians placed great reliance on the various styptics, and later adrenalin has been used, but I do not think modern physicians use drugs at all largely. I do not myself. In severe cases saline solution, with or without glucose, is I suppose administered subcutaneously by most practitioners. The question of operation has been much discussed in relation to profuse haematemesis in acute gastric ulcer. A good deal has been written about it, and I think most surgeons are not greatly in favour of it. It may be stated as a fact that the vast majority of cases of haemorrhage from acute gastric ulcer recover, but that occasionally profuse haemorrhage proves fatal. I think

that fatal haemorrhage is more common than is usually supposed, judging from the opinions of various writers and from what I have seen myself.

Whatever is the exact mortality from haemorrhage does not matter, the fact remains that *sometimes* it *does* prove fatal. It is not the *first* haemorrhage which kills the patient as a rule, but *repetitions* due to dislodgement of the clot. I think all will agree that unless the haemorrhage is so profuse as seriously to threaten life, the case should be treated medically. It is impossible to give exact indications for operation, and each case must be regarded as an individual problem. Such very severe cases recover, that it is nearly always impossible to say that a given patient would have died if he had not been operated upon, and many physicians would not agree with operation in any case. We have three points to go on in dealing with a case: (1) Profuse haemorrhage is sometimes fatal; (2) in the particular case under consideration the bleeding has reached the danger point; (3) many similar cases are recorded in which the bleeding point has been secured and the patient has survived. The second point is the really difficult one, namely, into what degree of danger is the patient to be allowed to enter before the surgeon be called in.

The question of the mortality of this operation should be put aside in the consideration, as the case is naturally desperate. If a patient vomits two or three pints of blood, and after an interval, if the clot breaks down and a similar amount be vomited, I think the case should be operated upon. But it is quite common for a profuse haematemesis to be followed by smaller ones at intervals, or for continued melaena only to follow, so that clear indications may not exist. In doubtful cases the most important point is to be guided by the amount of the initial loss, as indicating the size of the ruptured vessel more or less accurately, the condition of the pulse, and the colour of the patient. With regard to the operation itself there is only one thing to be done—namely, to rapidly open the stomach and secure the bleeding point in the way which commends itself best to the surgeon.

The operation is done as a means of immediately saving life, and gastro-enterostomy is, of course, useless. The acute ulcer may not be found, as sometimes it is almost healed, or it may be very small and the vessel may not be bleeding at the moment. The surgeon must take his chance of this event. Acute ulcers may be multiple, but it is unlikely that an artery will be opened up in more than one of them, and the most important can, at all events, be dealt with. The bleeding being stopped, the next stage in the treatment is to put the ulcer under the best conditions for healing. The following remarks apply equally well to the treatment of acute gastric ulcer, whether haemorrhage has previously occurred or whether the case has merely come up with an attack of pain and vomiting which, from the history and state of the patient, is probably due to an acute gastric ulcer.

In whatever way the initial change is produced which leads to an acute gastric ulcer, we know that the subsequent course of events is greatly affected by the gastric juice. I have been able to show that gastrotoxic ulcers fail to appear at all if the gastric juice be put out of action, and, on the other hand, that hyperacidity of the gastric juice increases the extent of the ulceration, since hydrochloric acid acts as a protoplasmic poison. A further point of importance is that an ulcer produced in the digesting stomach is very much more extensive than an ulcer produced by similar means in the fasting stomach.

However the ulcer be produced, and whether in man or in the lower animals, the same principles must obtain, since the laws regulating the digestive processes in all animals are the same. It seems that if we wish to have the smallest amount of damage done, we must keep the stomach in the resting condition, and the acidity as low as possible. Unfortunately, however, we have no clinical means at present of determining whether an acute ulcer in the human being is being produced or is in the condition of healing at the moment when it is brought before us. However, we *do* know that an acute ulcer is rapidly produced in from twenty-four to seventy-two hours with the gastric juice in its normal condition and the diet normal, so that probably when the case comes under the notice of the physician the ulcer is already fully formed. This probability is strengthened by the results of *post-mortem* examinations. We further know that the natural tendency of an acute gastric ulcer in both man and the lower animals is to commence healing at once, and for the healing to be complete in a few weeks. This fact is well known experimentally, and is certainly so in the human being, because scars similar in all particulars to those found in experimental animals may be seen in patients who have had short attacks of illness similar to those of gastric ulcer.

Cases are also recorded of injuries inflicted upon the stomach in man which were found to have healed rapidly by *post-mortem* examination. It is also a very common experience, when death occurs from haemorrhage in acute ulcer, to find it advanced in healing, although the illness has been of very short duration. We have seen that occasionally acute ulcers may be delayed in their healing, and that sometimes they may extend, so that it is more important, from the point of view of the treatment of a case, to find out what conditions promote or hinder the *healing* of acute gastric ulcer than what is the actual initial lesion provoking its formation. It is here that experiments upon animals have been of great assistance in affording indications for treatment. It is merely necessary to state here that various experimenters have been credited with proving that hyperacidity of the gastric juice delays the healing of an acute ulcer. In my opinion many of these experiments are of no value, because a definite ulcer was not produced in the first instance, the solutions employed were in some cases too strong, and an insufficient number of experiments were done. My own experiments have shown that so long as the motor power of the stomach is intact a hyperacidity of such a degree as is likely to be found in pathological conditions will not delay the healing of an acute ulcer, and I am not alone in maintaining this position, because more recent experimenters have confirmed the point.

When the ulcer is being formed, and the gastric juice is acting destructively, hyperacidity will increase this destructive tendency, but when healing has commenced hyperacidity has no more influence in delaying this than has the normal gastric juice. I have also found that diminished acidity of the stomach contents or moderate infection of the food are likewise without influence. The question is a different one when the motor power of the stomach is disturbed, because when retention of food occurs the healing is definitely delayed for a period of at least twice the normal time. This is due to prolonged contact of the partially-digested food with the connective tissue base of the ulcer, in which necrosis and excessive formation of fibrous tissue are produced, so that the epithelium grows over the base with more difficulty than normal. This being the case, one would expect that an ulcer would not heal so well if the animal were fed on solid food as if it were fed on milk. This is undoubtedly the case, but the effect is seen only in the early stages of healing. When an ulcer is healing, the granulation tissue of the base first becomes covered with a layer of flattened epithelium, consisting of a single layer of cells, and later on this layer thickens and glands develop. Until a continuous layer of cells has formed, the connective tissue of the base is exposed to the action of the digestive fluids, and healing may be delayed, but when once the base is covered up, even with a single layer of cells, the remaining stages will go on normally. Meat is retained longer in the stomach than milk, and produces a larger secretion of gastric juice. On a milk diet I have found that the base of the ulcer is covered with epithelium much quicker than on a meat diet. But I have been surprised to find that diet does not make a greater difference than it does, because even on a meat diet, it is only a question of a little delay in the earlier stages. However, there is no doubt that the most favourable diet in the early stages is a fluid one which is easily digested and not retained long in the stomach. The most important principles to be observed are to allow the stomach to empty itself as quickly as possible, and to give a food which produces only a moderate flow of gastric juice. My experiments on animals have convinced me that rectal feeding for any condition except gastric haemorrhage is to be condemned, and that the milk and egg diet of Lenhartz has much to commend it. In fact, so long as the diet is fluid to begin with for a week or ten days, and at first given in small quantities at frequent

intervals, and so long as solid food is not too suddenly given, I do not think the exact quality of the food matters very much, except that meat extracts should not be used. Lenhartz's method is not altogether founded on correct pathology; his diet is intended to neutralize hyperacidity, which it cannot do, and he puts an icebag on the abdomen to diminish the movements of the stomach, which can only lead to delayed emptying of that organ. Moreover, I do not think that one definite and fixed diet is suitable for every patient, and it is unnecessary.

I do not think that a better diet than peptonized milk can be used for the first three or four days in most cases, followed by ordinary milk, raw eggs and chicken jelly, then breadcrumbs, pounded fish and chicken, milk puddings, boiled eggs, custard and bread-and-butter, and later minced chicken and mutton, potatoes and sieved vegetables, but I do not wish to be dogmatic in laying down definite rules. I think that the patient should be on a more or less full diet at the end of a month. I have found that beef even after this time is badly borne by most patients, and I think it is best not to allow it for the next few months, during which time I warn the patient to live on the simplest food and properly masticate it, to have the teeth properly attended to, and to rest before and after meals. For the relief of pain I use an epigastric ice-bag when haemorrhage is occurring, and in all other cases hot poultices.

I have not found bismuth to be of any particular value, but sometimes order dilute hydrocyanic acid, 5 minims in two teaspoonfuls of water, for vomiting. When the patient is convalescent I think some preparation of iron should be given. It is very improbable that any direct connexion between chlorosis and ulcer of the stomach exists, but still the effect of anaemia upon the healing of acute gastric ulcer is an important point, because haemorrhage leading to anaemia is a common event in ulcer. The fact that an ulcer readily heals although bleeding is going on from the centre of it, seems to show that the importance of anaemia in preventing healing has been over-estimated. Quincke[2] did two experiments in which lesions were produced in the dog before and after bleeding. In the first experiment the anaemic ulcer took at least thirteen days longer to heal than the normal ulcer. The second experiment proves nothing because the condition of the ulcer is only described up to the twelfth day. Silbermann's[3] and Litthauer's[4] experiments are not quite comparable to the class of case we are dealing with, because they produced haemoglobinaemia by injection of chemicals. The evidence that previous loss of blood delays the healing of an ulcer is therefore of no great importance, certainly not sufficiently conclusive to demand the exhibition of iron during the treatment of acute gastric ulcer.

I have so far dealt with the best means of promoting the normal healing of acute gastric ulcer.

I have already mentioned that in man acute ulcer may be delayed in its healing, and also that an acute ulcer may gradually increase in extent. Unfortunately we have no clinical means of diagnosing such conditions at present except that the history is longer than that of an acute ulcer, and haematemesis may occur late in the disease. I regard such conditions as intermediate between acute and chronic ulcer, and there is no doubt that one factor in the causation is retention of food, so that these cases should be treated as I have already described for acute ulcer, the time and the graduation of the treatment being somewhat extended.

Treatment of Chronic Gastric Ulcer.

No experimenter has ever yet succeeded in producing a chronic gastric ulcer in an animal, so that we know practically nothing about its mode of extension, or the conditions under which it heals. I think that the healing of a chronic ulcer is perhaps less common than is usually supposed, because it is probable that, judging from the extensive scarring which may follow an acute ulcer in animals, many scars which have hitherto been considered to result from the healing of chronic ulcers have really been those of acute ulcers more or less delayed in their healing. We certainly know that, as a rule, the symptoms of a chronic ulcer rapidly disappear with rest and appropriate diet, but how many of these ulcers heal it is impossible to say. Probably not many, judging from *post-mortem* records and the previous history, which usually tells of several previous attacks of a similar nature.

In the treatment, all we can do is to be guided by the principles we have observed in the treatment of acute ulcer. We cannot, however, expect a thickened chronic ulcer to heal in three or four weeks as an acute ulcer does. It must first be got into such a condition that it will stop spreading, and that healing may commence. After this the actual healing must be slower than in the acute form of the disease, so that although the same principles must be adopted, the treatment must extend over a considerably longer period. I was able to show experimentally that in the condition of pyloric stenosis an existing ulcer often took on a spreading character, and rapid ulceration occurred in the surrounding mucous membrane, and I have lately seen two clinical cases in which a chronic ulcer rapidly spread by acute ulceration of the adjoining mucous membrane in acute pyloric obstruction; sometimes one may see evidences of the same thing in closely examining ordinary chronic ulcers of the stomach. The chief symptom of these cases was coffee-ground vomiting, which apparently denoted acute extension of the ulcer. I think it must be taken for granted that recurrences of haemorrhage in a chronic ulcer indicate extension of the ulceration either laterally or in the depth of the ulcer, and there can be no doubt that delayed emptying of the stomach is one cause of such extension.

This is supported by the fact of cessation of haemorrhage from chronic ulcer after gastro-enterostomy, which by allowing of the rapid emptying of the stomach probably stops the extension of the disease. To quote a series of such operations with known after-results: out of 21 cases of simple gastro-jejunostomy for recurrent bleeding in chronic ulcer by Moynihan,[5] 2 deaths occurred and the remaining 19 patients were free from recurrence of haemorrhage. A few of these cases were duodenal ulcers, how many is not stated, but the majority were chronic gastric ulcers. Both the cases I have quoted above were operated upon for perforation, and in both cases acute pyloric stenosis was produced, with the result that acute extension of the ulcer occurred. This is a very strong argument in favour of performing gastro-enterostomy in addition to stitching up the perforated ulcer, as advocated by Paterson[6] and other surgeons, although the advisability of this must, of course, be left to the surgeon, who should decide at each individual operation, according to the conditions found. It is therefore of great importance, in the treatment of chronic gastric ulcer as in that of the acute disease, to take care that no undue delay occurs in the emptying of the stomach. As in acute gastric ulcer I think that there is only one condition which necessitates the stomach being kept empty and in which rectal feeding should be temporarily resorted to, and that is haemorrhage. The treatment of haemorrhage from a chronic ulcer I conduct on exactly the same lines as I have described for the acute ulcer.

It is perhaps more necessary to give an alkaline fluid by the mouth in the chronic disease, as a large number of cases have hyperacidity, which increases the destructive action of the gastric juice when an ulcer is extending, as it is in recurrent haemorrhage.

In the treatment of a case in which haemorrhage has ceased or in which no haemorrhage has occurred, we must remember that we have no certain means of telling whether the ulcer is extending, is stationary, or in the condition of healing, so that we must be guided by the two principles that delayed emptying of the stomach increases the tendency to acute extension of the ulcer and delays the healing, and that hyperacidity increases the tendency to ulceration.

Believing, as I do, that the propagation of chronic gastric ulcer is chiefly dependent upon local conditions of the stomach rather than upon the condition of the blood of the patient, I administer the same diet as in the acute condition, but increase it more slowly and extend the treatment over a longer period, thereby relieving the stomach rather than placing the condition of nutrition of the patient in the first place. It is, of course, impossible for a chronic ulcer to heal in a month, as the acute variety is hardly healed before this time, so that I think the treatment should extend over a period of six weeks, during which the patient is confined to bed, and a further

six weeks during which he is allowed to get up. After this he is to eat a light diet for several months, instructions being, of course, given with regard to the care of the teeth, mastication, regular action of the bowels, and exercise.

With regard to the *quality* of the diet, I think that of Lenhartz leaves nothing to be desired. I, however, strongly object to the principle of feeding a bleeding patient, and I do not think solid food should be allowed till the beginning of the third week, milk, eggs, and jellies being the diet for the first fortnight.

During the second fortnight the patient should gradually get on to pounded fish, pounded chicken, lightly boiled eggs, thin bread-and-butter, and custard.

During the third fortnight, minced chicken and mutton, potatoes and sieved vegetables, and milk puddings.

During the next six weeks he would gradually be put on an ordinary light diet, at which he would remain for the next few months.

I give this only as a broad outline and leave the exact details to be filled in in each individual case by the medical attendant according to his ingenuity.

I think iron ought not to be given as a rule till after the first six weeks, and I do not think that bismuth is of any use. For pain I think hot poultices are sufficient, except the patient is bleeding, and then an icebag should be applied. Vomiting is treated by modifying the diet and by hydrocyanic acid in small amounts of water. The Carlsbad water of von Leube[7] is certainly useful as an aperient but in no other way. Neither do I think that the constant application of poultices which he so elaborately describes is of any value except occasionally to relieve pain. In addition he does not keep the patient long enough in bed. The gelatine treatment of Senator[8] does not give any better results in any way than other methods, and it has certainly not become popular. We know of no specific treatment for gastric ulcer, so that any special treatment can be one in name only. As a fact each of the three special methods gives practically the same results with regard to mortality and immediate results. Statistics are constantly published by many observers and differ more or less as would naturally be expected. Von Leube's mortality is variously given as from 0.3 to 4 per cent., Senator's about 4 per cent., and that of Lenhartz from 2 to 3 per cent. Von Leube states that he completely cured 566 patients out of 627, and of these 475 were cured under five weeks. In one group of statistics of patients treated according to Senator 28 out of 50 patients were said to be healed in an average of 20.5 days.

Such statistics as these are obviously of little use, but they show that the special factor underlying each treatment does equally little harm to the patient if it does no good. What we want to know is how many patients are cured as shown by after-results, because cessation of symptoms is no indication that the ulcer has healed. Statistics supplying these facts are scanty. Spriggs[9] gives the after-results of 21 cases treated by the Lenhartz method: 9 had a definite return of the symptoms of ulcer, and 3 indigestion.

These cases probably included acute as well as chronic ulcer, although the author does not separate them; and it is more than likely that return of symptoms in true chronic ulcer would occur in a larger percentage of cases whatever the treatment. In other words, I think it is probable that not half the cases of chronic ulcer heal by medical means; according to Paterson's statistics[10] about 26 per cent. are cured. I think a fair treatment, such as I have described above, and extending over three months, should be given, and if the symptoms return a surgeon should be called in to perform gastro-enterostomy, which, according to what we know of the pathology of the disease, is a rational procedure, and produces its good effects by allowing the stomach to empty itself rapidly.

I am quite aware that symptoms may return after this operation, but the same may be said of gastro-enterostomy for pyloric obstruction, and no one would hesitate in handing such a case over to the surgeon. To sum up, it may be stated that acute gastric ulcer of normal or delayed healing is to be treated by medical means, except those cases which perforate, and perhaps a few in which dangerous haemorrhage occurs; these latter are to be handed over to the surgeon. Probably more than half the cases of true chronic ulcer should be treated surgically, but a three months' medical treatment is to be tried first, followed by careful dieting, when, if further symptoms occur (pain, vomiting, haematemesis), the ulcer is probably incurable by medical means. All cases of pyloric obstruction, hour-glass stomach, perigastric adhesions, and perforation are to be at once treated surgically.

A final word may be added with regard to prophylactic treatment in patients who have recovered from gastric ulcer.

We know that bacteria and their products are one important cause of acute ulcer, and it is proved that they do so by attacking the stomach through the blood stream, but there is no evidence to show that they are able to do so from the cavity of the stomach in the ordinary condition of that organ. It is, therefore, important to remove all possible sources of infection, such as pyorrhoea alveolaris, chronic appendicitis, and so on. I need not remind you that in chronic appendicitis haemorrhage may occur from the stomach. I have stated above that hyperacidity of the gastric juice is an important predisposing cause of ulceration, and my experiments have demonstrated that other acid substances and protoplasmic poisons, in very weak solutions which are innocuous alone, are able to markedly increase the tendency to ulceration of the stomach. Amongst such acids is acetic acid. I have found that acetic acid of one-eighth the strength of vinegar is able to act in this way, and it is a not uncommon practice amongst a certain class of people to consume large quantities of vinegar. Many other substances which are unconsciously taken in with the food may act in a similar manner.

This side of the subject is quite in its infancy, and these remarks must be rather taken as suggestions for future investigations than as a basis on which to found a definite prophylactic treatment. Still, they show the importance of teaching the patient how to diet himself properly, and to avoid food to which preservatives have been added. It goes without saying that to keep the stomach free from disorders of function must be an important point in prophylactic treatment.

In conclusion, it is true that I have told you nothing new in the treatment of gastric ulcer, but I may, nevertheless, have been able to place the principles of treatment which I have advocated upon firmer foundations than they were before, and, if this is so, our time to-day has not been wasted.

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A Clinical Lecture

ON THE

NECESSITY FOR OPERATION IN GASTRO-DUODENAL ULCERATION.

BY

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Gentlemen,—In the male ward there happen to be at present three cases of gastro-duodenal ulceration exhibiting three sets of quite different phenomena. I will take the opportunity, therefore, of discussing the question of surgical interference under the conditions which are illustrated by these cases. Before describing the histories of the patients, I would draw your attention to the fact that in all three the pathological lesion with which we are faced is that of *chronic* ulceration. The pathology of this condition is at present obscure. We cannot consider it as an accidental circumstance that all three patients are of the male sex, because chronic gastro-duodenal ulceration is more common in men than women in the proportion of almost 3 to 1. In women the lesion most commonly met with in the stomach is the so-called acute ulcer, of small size, depressed floor, and steep non-indurated edges. This

ulcer is frequently multiple, and is much more commonly situated in the cardiac and middle zones of the stomach than in the pyloric zone. The chronic ulcer is usually an inch or more in diameter (at any rate when seen by surgeons), with an irregular margin, which shows definite induration. Further, the chronic ulcer is nearly always solitary, and in three out of every four cases is found in the pyloric zone or the duodenum. These differences in the pathology are sufficiently marked to suggest that the chronic ulcer has an etiology different from that of the acute round ulcer. But whether the distinction between the two is really fundamental is a question which awaits further evidence. Ignorant as we are of the etiology of these conditions, we are unable to lay down any laws of prophylaxis. During certain stages of the process there are certain measures, which are commonly called medical as distinct from surgical, which no doubt favour its healing and cicatrization. At the same time there occur accidents and complications which more or less urgently require surgical aid. As to the necessity for operation in some of these accidents and complications, there is complete agreement throughout the medical world, but there is a considerable area of debated ground in regard to others.

My first case belongs to the category of uncontroversial problems. The patient is a man aged 52, who while passing through Liverpool was suddenly taken with acute illness. On being brought into the hospital a diagnosis of perforation of duodenal ulcer was at once made. His home is twenty miles from a hospital; he was on his way to cross the Atlantic to Canada, so that you see he selected a time most favourable to his chances of recovery for perforating! He is an example of the class of case in which the first definite sign of ulceration is perforation, for except for a vague discomfort some three hours after food a few weeks before admission he can tell us of no previous gastric or duodenal symptoms. The diagnosis of perforation depended upon the presence of two physical signs. In the first place, he exhibited extreme abdominal rigidity, most marked on the right side. In the second place, the liver dullness was absent. He had not vomited. He was submitted at once to operation, from which, as you see, he has made a good recovery.

In connexion with this subject of perforation there are several points which I desire to emphasize. The first is the extraordinarily good general condition which many of these patients show when first seen. We may have a history of sudden excruciating pain, but not infrequently it is difficult to believe that anything serious has happened when we medical men are first brought face to face with the patient. This is, perhaps, particularly true of the strong and apparently robust men who form a considerable proportion of those who suffer this accident. Of the various physical signs which go to establish a diagnosis of perforation, you will do well to place the greatest reliance on the absence of liver dullness. Percussing the thorax from above downwards, you find that although the note changes you are unable to demonstrate the loss of resonance which you expect to meet with when passing from lung to liver. One occasionally meets with cases in which this is the one and only physical sign of perforation which can be demonstrated, though it is perfectly true that very rarely is marked abdominal rigidity absent. The details of operation in such cases need not take up our time, but two points are worth mentioning. In the first place, the wound through which the ruptured ulcer is reached may in almost all cases be sewn up as one sews up an ordinary wound of the abominal parietes; in the second place, it is never safe to omit drainage of the pelvis through a hypogastric wound. Those who have tried the omission of this drainage in cases where they believed that effusion of stomach contents was restricted to the immediate neighbourhood of the perforation will probably have found reason to regret the omission, as I have done myself. After operation this patient was treated, as we treat all such patients now, with continuous rectal saline injections in the sitting posit on.

Our second patient illustrates another acute accident, but one in which the indications for operation are not so definite. He is a man aged 34, and six years ago was attacked with severe pains in the upper part of the abdomen, associated with vomiting. Ever since then he has had "indigestion"—that is, pain coming on from half an hour to an hour after taking food, sometimes lasting for several hours and then not infrequently ending in vomiting. Three weeks ago he had copious haematemesis, and since then he has had two more attacks of the same. You see at the present moment he is extremely pallid and looks emaciated. It is now six days since his last attack of haemorrhage from the mouth, and his stools still contain blood in small quantity. His pulse is small and of low tension, 96 per minute; his red cells are reduced to 1,500,000.

You will observe that so far he has had no surgical treatment, and the lesson from that is that very rarely indeed is it either necessary or wise to operate with the idea of arresting haemorrhage from ulceration by some surgical method. With proper measures, the great majority of cases of haematemesis may be trusted to recover from their attack of haemorrhage. The operation, if it is to be done at all, should be postponed until the patient has recovered from the haemorrhage. This is the course we propose to pursue in the case of this patient; so far we have aimed at producing local and general rest; when, however, he has recovered from his attack, we shall advise him to submit himself to an operation. What that operation will be exactly, we are not in a position to state with absolute certainty; we believe the ulcer to be pyloric in position; he is a comparatively young man, and therefore we do not anticipate that it is cancerous, and under these circumstances a choice will be made at the time of the operation between excision of the ulcer and gastro-jejunostomy. In pyloric ulcers either of these procedures may be trusted to give good results, but we prefer to do excision if excision proves easy and does not involve encroaching on some neighbouring organ such as the pancreas. If we are right that the ulcer is pyloric, experience goes to show that gastro-jejunostomy, though less radical, is of very great assistance in bringing about the healing of the lesion. I have already said that patients do not often die directly from loss of blood from ulceration; it is none the less an extremely serious complication, and when, as in this case, we believe it to be due to the erosion of a chronic ulcer, there can be little question that operation is the wisest course to pursue. You are aware that haemorrhage into the stomach occurs from a variety of causes, and that patients have occasionally been submitted to operation for haemorrhage which was not suitable for surgical remedy. This has, perhaps, most frequently been in cases of gastric haemorrhages of young women. I shall not discuss this question at length now, but content myself with simply saying that where there is definite evidence that the cause of haemorrhage is the erosion of an ulcer of long standing there can be no reasonable controversy as to the advisability of surgical measures. If gastro-enterostomy is performed it is necessary to remember that it is only a measure which *aids* healing. Disappointment sometimes arises from the idea that because the patient "has had an operation" he may choose his own diet and neglect medical measures forthwith. Overloading the stomach and hyperacidity are two things which sometimes spoil the effect operation would otherwise have, and a third desideratum in regard to which he must always be instructed is proper mastication. On the cleanliness of the mouth and the thorough use of the teeth the result of the operation largely depends. To sum up the lesson of this case: serious haemorrhage in chronic gastro-duodenal ulceration requires surgical remedy, not at the time of haemorrhage but after an interval of about three weeks. An "interval" operation is required to save the patient from the recurrence of this very serious complication.

The third patient is a labourer aged 49, whose chief complaint was epigastric pain for six months, coming on more intensely about an hour after food, but present off and on for the whole day. He stated also he had lost weight considerably, but we do not know exactly how much. He had medical treatment during the whole of this time, and found most relief from restricting his diet to easily-digested foods. Constipation was another troublesome symptom; he did not vomit. On palpation of the abdomen there was slight tenderness in the epigastrium no tumour could be felt, but splashing was easily elicited. Furthermore, through his thin abdominal wall peristaltic waves could be seen passing from the left costal border towards the right. We examined the position of the

stomach with the radioscopic screen. After a bismuth meal it could be seen that the greater curvature of the stomach extended as low as the plane of the anterior superior spines when the patient stood up, and active peristaltic movements of the stomach were clearly made out. Test meals showed that free hydrochloric acid was present in the gastric secretion, and also that the stomach contents were retained for many hours beyond the normal. A feature of the case was the absence of sarcinae; apparently, although there was marked stasis of stomach contents, there was little or no abnormal fermentation going on.

This man had therefore marked dilatation and ptosis of the stomach. It was not purely atonic dilatation, for we could see the stomach walls in active and forcible peristalsis. The ptosis was not part of a general abdominal ptosis for no other organ exhibited it. A forcible peristalsis which we can see must always be taken as a definite sign of obstruction, an attempt of the viscus to empty itself against resistance. In this case we judged by what we could see with the screen that the obstruction was at or about the stomach outlet. Considering its presence it is a rather remarkable fact that the man had not suffered from vomiting; it would appear that the stomach had always been able to pass on its contents, although the marked dilatation showed that it had been done under difficulty.

In view of the evidence of obstruction about the pylorus we had no hesitation in recommending an operation. There are types of gastric dilatation in which operation is useless. Purely atonic dilatation of the stomach does occur, although in the past some of the cases so diagnosed were probably a late stage of dilatation resulting from obstruction. In purely atonic dilatation operation is not of value, but the condition is decidedly a rare one. Operation is again of little value when gastric ptosis and dilatation is simply a part of a general ptosis of the abdominal organs. These two conditions should therefore be excluded when the stomach is found dilated before any decision is made to advise operation. In this case on opening the abdomen a cicatricial stenosis of the pylorus was found, and the stomach besides dilatation showed marked hypertrophy of its walls. Posterior gastro-jejunostomy was performed, and care was taken to provide a large opening of 2½ in. The patient vomited twice on the evening of operation, but has not done so since. He was allowed milk diluted with Vichy water on the following day, and now, six days after his operation, he is on a light diet. He has been given bicarbonate of soda, and carbonate of magnesia after each meal in order to prevent any high acidity of the gastric juice, which would interfere with the healing of his gastro-jejunostomy wound. Experiments have shown that such wounds take three or four weeks to heal.

This case belongs, as did the first, to the class of gastric conditions in which the necessity for operation is accepted by all. If you can demonstrate that there is in any portion of the alimentary canal an actual mechanical obstruction to the onward passage of the contents the wisdom in advising operation for the relief of this obstruction is unquestioned. It is of course unnecessary when the ulcer is cicatrized to deal in any direct fashion with it, and we can give complete relief by short-circuiting the food stream. It is very necessary in doing so to be careful of two things—first, to provide a large anastomotic opening; secondly, to avoid the formation of an acute angle at the point of anastomosis. With the latter object a posterior anastomosis is preferred, joining the jejunum to the stomach as close as possible to the commencement of the former.

The indications for operation presented by these three cases by no means exhaust the problems of operation in gastro-duodenal ulceration. You will observe that all three illustrate rather complications of the ulcerative process than simple ulceration itself. In considering the advisability of operation in simple chronic ulceration we are faced with the not infrequent difficulty of diagnosis. Pain, with a constant time relation to the intaking of food, is a symptom sufficient on which to base a definite suspicion of gastro-duodenal ulcer, but it needs to be supported by further evidence before one can say with anything approaching certainty that the ulcer is present. Of the phenomena which lend it support haemorrhage is far and away the most important, and it is therefore worth while taking a great deal of trouble to discover whether there is bleeding into the stomach or duodenum. In some cases persistent pain in spite of treatment is in itself sufficient justification for an exploratory operation. Such an operation is not speculative, as we know that this pain, with a constant relation to food, is in some cases the one and only symptom of ulcer, and also of other gastric or perigastric conditions remediable by surgical measures.

Most surgeons nowadays prefer to deal with an ulcer directly—that is to say, by resection. The most important argument of all for this proceeding is the frequency with which carcinoma is implanted on ulcer. On this subject a most important communication has recently been made by Dr. W. C. McCarthy of St. Mary's Hospital, Rochester, from which it would appear that this sequence of events is even more common than has hitherto been expected.

I shall say no more on the subject of ulceration apart from its complications, as I have at the moment no illustrative case to show you. I will simply give you some reasons why we should take the opportunity which surgery affords of relieving patients from this serious disease even in the absence of complications. In the first place, gastric ulcer untreated is attended by a mortality which has been estimated at 10 per cent.; in the second place, whether medically treated or not, it is liable to be complicated by accidents seriously endangering life; in the third place, while it is notoriously difficult to obtain definite healing, when this does occur it is liable to be associated with such cicatricial contraction that stenosis follows.

HEPATIC ABSCESS FOLLOWING ACUTE APPENDICITIS.

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The occurrence of hepatic abscess after acute appendicitis is a very rare complication, and although a considerable number of cases have been collected and recorded by Kelly and others, in most of them the suppuration in the liver had only been discovered at a *post-mortem* examination, and the abscesses were multiple, and therefore were scarcely amenable to surgical treatment.

In the two cases which have occurred in my practice, both were discovered during life and treated by operation.

In the fatal case I believe that no other abscess was present, as I had the opportunity of examining the liver a week after opening the hepatic abscess, and then no external evidence of another liver abscess could be detected. In the successful case the abscess was certainly single. The occurrence of suppuration of the liver is usually a late phenomenon seldom occurring until some weeks after the acute attack. In my two cases the interval between the commencement of the disease and the detection of the abscess was eight weeks and four and a half weeks respectively. It is interesting to note that both cases were apparently convalescent, with a normal temperature for the first fortnight after the operation on the appendix. In one case the abscess followed an operation for an appendix abscess, which was opened about three weeks after the initial attack and was thoroughly localized; while in the second case the operation was performed for a perforated appendix with localized peritonitis within forty-eight hours of the onset of the disease.

There is little doubt that the poison is carried to the liver by means of the portal vein, and that the abscess results from pylephlebitis. The patches of pylephlebitis must be close together and the infection very virulent for a single abscess to form. When the patches of pylephlebitis are separated from each other by any amount of normal liver tissue, we shall have the condition of small multiple abscesses, which is more commonly found in the post-mortem room. It is interesting to note that the pus obtained from a liver abscess does not have the characteristic odour of pus from an abscess in connexion with the appendix. With regard to diagnosis, it is practically impossible during life to distinguish between a liver abscess and a subphrenic one. The only point which would suggest abscess of the liver, rather than subphrenic abscess, would be bulging of the right side of the chest with increase in

the width of the intercostal spaces rather than pushing down of the whole liver. When an exploratory puncture has been made and the pus has not got the characteristic odour of an appendix abscess the suspicion that the case is one of hepatic abscess will be considerable. It is often stated that cases of hepatic abscess following appendicitis will show some amount of jaundice, or at any rate an icteric tinge in the conjunctivae. This sign, however, cannot be of great importance, as it did not exist in either of my patients.

With regard to treatment, it is important that the surgeon should be prepared to operate immediately he has discovered pus by means of an exploring needle, since there is a risk of escape of pus into the pleura or peritoneal cavity when the needle is withdrawn.

The abscess will practically always be reached by a similar incision to that employed for subphrenic abscess, namely, one over the ninth rib behind the anterior axillary line. Portions of the ninth and tenth rib are resected, and the diaphragm exposed. In some cases the pleura will be opened in this incision, and if so, its edges should be stitched to the diaphragm.

When the diaphragm is divided, the posterior surface of the liver is exposed, and the exploring needle should be inserted in the direction in which pus had previously been found. When pus is found a director is passed down by the side of the exploring needle, and the exploring needle removed. Gauze is then packed in between the liver and the diaphragm. A pair of sinus forceps are inserted along the groove of the director into the abscess cavity, and a track broken down through the liver substance by withdrawing the forceps. Along this track a large drainage tube is inserted, and the abscess sac is washed out with saline solution by means of a small catheter inserted through the drainage tube. The drainage tube is fixed to the skin, and the rest of the wound closed. There is little risk of any trouble with the pleura, but there may be more risk of infection of the subphrenic space; this occurred in my first case, and was responsible for its fatal termination. The following are the two cases which have occurred in my practice:

CASE I.

A young man, aged 25, was first seen by me on February 7th, 1903. He had had an attack of appendicitis at Christmas, 1901, but this only lasted one or two days. Another more severe attack occurred at Easter, 1902, which lasted three or four weeks, and during the attack the patient had a high temperature, vomiting, and a definite lump in the right iliac fossa. The lump, however, disappeared after rest in bed, and he remained in good health until the middle of January, 1903, when he suffered from another acute attack of appendicitis. It commenced with vomiting, and the temperature had been irregular, varying between 102° and 99°. A definite lump had been discovered a few days before I was asked to see the case, three weeks after the commencement of the attack.

On examination there was a large swelling in the right iliac fossa, which was dull on percussion. The rest of the abdomen moved well and was quite soft. On rectal examination it was found that the inflammatory mass extended towards the pelvis. On the following day the patient was anaesthetized and an incision made in the right iliac region. The abscess was opened without separating any peritoneal adhesions. It was found to extend into the pelvis; no search was made for the appendix; two drainage tubes were inserted, one upwards towards the appendix, and the other downwards into the pelvis. The temperature became normal on the day following the operation, but on the third day some faecal matter was noticed in the dressings. This, however, stopped after about a week; the tubes were removed and the discharge became trifling in amount, the temperature remaining level. Three weeks after the operation the temperature again rose. Careful examination of the wound failed to elicit any cause.

I saw him on March 4th, and again on March 10th, but could not discover any evidence of a collection of pus. The temperature remained high, the pulse rapid, and the tongue foul.

On March 15th I found that the liver dullness was slightly increased downwards, and there was some tenderness over the liver. I decided to explore the liver. An incision was made in the upper part of the linea semilunaris, and the liver exposed. There were no adhesions in the neighbourhood of the liver. On passing a trocar into the liver pus was obtained. A free opening was made into the abscess of the liver, and a drainage tube inserted. The patient progressed favourably for a week. The temperature became normal, and his general condition improved. On March 20th his temperature again rose, and on examination it was found that there was a mass in the right lumbar region, which was tender on pressure. An incision was made in the loin, and a subphrenic abscess opened and evacuated. The temperature fell after this, but the patient died a few days later from exhaustion.

In this case the original appendix abscess had formed nearly three weeks after the commencement of the attack of appendicitis. When opening the appendix abscess no adhesions were disturbed and no evidence of any septic absorption appeared until three weeks after the operation. Without any rigor the temperature suddenly rose and remained high until the abscess of the liver was discovered and opened, thirty-five days after the original operation.

The further complication of the subphrenic abscess was probably due to some escape of pus from the liver abscess, which tracked round to the posterior surface of the liver. This would probably have been avoided had a counter-opening been made into the liver after resection of a rib.

CASE II.

A boy, aged 15, was admitted into the West London Hospital on January 14th, 1910. He had been seized with acute pain in the right iliac fossa forty-eight hours previously and had vomited several times. On admission his temperature was 102°, pulse 100. The abdomen did not move on respiration, but was not distended. There was acute tenderness and rigidity of the lower half of the right rectus muscle. There was no loss of resonance in the right iliac fossa. The patient was put under an anaesthetic immediately after admission, and the abdomen opened by the gridiron incision. An abscess cavity, containing 2 or 3 oz. of pus was found between the caecum and the anterior abdominal wall. This was emptied and wiped clean.

The appendix, which was gangrenous, was removed, and a gauze plug left in the abscess sac. The patient's temperature fell to normal immediately after the operation, and remained so for three days, when the gauze plug was removed. The temperature remained up for three days, and then dropped to normal, and remained nearly normal for a week. Fourteen days after the operation the notes state: "Discharge very slight, temperature normal, progress satisfactory, wound almost healed." After this the temperature rose on several occasions to 101°. There were no signs of any bowel irritation, but some dullness was found at the base of the right lung.

On February 3rd, as the temperature was still up, and the dull area at the right base had increased, an exploring needle was introduced, and about 2 drachms of clear fluid were removed. This was examined microscopically. No pus nor micro-organisms were found; the cultures also were sterile. The chest condition remained unchanged, the temperature varied between 103° and 100°, so an exploring needle was again inserted on February 10th, and clear fluid again drawn off. This was again examined, and no micro-organisms found. On February 12th there were still signs of fluid in the right pleura, the lung was compressed, and the heart slightly displaced to the left. Whispering pectoriloquy was well heard over the dull area. The liver was slightly depressed, and extended a finger-breadth below the ribs. The rest of the abdomen was normal. The temperature was 101°. The chest was aspirated, but only 1½ oz. of clear sterile fluid was obtained.

On February 15th it was noted that the liver extended three fingerbreadths below the costal margin. The signs at the right base were unaltered. The temperature remained 101°. The right base was again aspirated; a long needle was used, and was pushed deeply into the liver, when pus was drawn off. This pus was examined in the laboratory, and was found to be swarming with bacteria, which were mostly coliform organisms, but there were also streptococci; the former were obtained in cultures. In the pus there were also many cells of the liver parenchyma, some in columns, and others detached. The exploring needle had been inserted in the seventh interspace, so an incision was made over the eighth rib, which was resected in the mid-axillary line. The pleura was opened; it contained some clear fluid, and was shut off with sutures.

The diaphragm was divided, and the posterior surface of the liver exposed. The abscess was opened, as described above, and about 8 oz. of pus let out. A large drainage tube was inserted, and the cavity washed out in saline. The temperature fell to normal immediately after the operation, and the discharge quickly diminished in amount, the tube being removed a fortnight after the abscess had been opened.

The patient was discharged to a convalescent home five weeks after the incision of the liver abscess, all wounds healed soundly, and he is now in perfect health.

A CAUSE OF DEATH AFTER OPERATION FOR APPENDICITIS:

THE THREE LINES OF DEFENCE.

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IT cannot have escaped notice that operations for appendicitis, especially when performed upon children, are far too frequently followed by a fatal ending, which sometimes occurs with startling rapidity, not necessarily in the severe and apparently more dangerous cases of general peritoneal infection, but where a localized abscess has been operated upon by a skilled surgeon, and there is no obvious reason for such an untoward result.

Unfortunately in the medical journals it is too customary to record successful cases, and for the fatal ones we must

look to the obituary columns of the daily press. Some years ago I had a very painful experience in my hospital practice, losing four or five cases of appendicitis in quick succession, in the same mysterious manner. Such an experience "gives one furiously to think," and I believe I have found out the explanation. It is in the hope that this may avert a similar experience in the practice of others that I feel obliged to call attention to these cases. The cases were all very similar, the operation was performed in the same manner, and one description will suffice.

A boy of about 9 years old was admitted to the hospital with a definite inflammatory swelling in the appendix region with all the signs of abscess formation including leucocyte count. His general condition fairly good.

Operation on the fifth day from the onset.

An incision was made in the semilunar line opening the peritoneal cavity; the inflammatory swelling around the appendix was carefully packed all round with gauze so as to shut off the peritoneal cavity. The abscess was opened by insinuating the tip of the finger between two adjacent coils.

Pus as it escaped was immediately mopped up with gauze, and when no more escaped the abscess cavity was opened up further and sponged with gauze till it was *quite clean and dry*. (In cases in which the appendix was easily removable, it was removed at this stage, but in most of the cases the appendix was left.)

A drainage tube was introduced into the cavity, which was also packed with gauze soaked in iodoform emulsion and squeezed fairly dry.

The ends of the wound were closed, leaving sufficient space in the centre for the gauze and tube. I hoped by operating in this manner to cut short the period of healing, and that little or no suppuration would occur.

The operation took a very short time, there was no evidence of shock, and the patient left the table in a perfectly satisfactory condition.

From six to twelve hours later an obvious change took place. He became pallid and restless, the pulse increased considerably in rate up to 140 or 160 per minute, and the temperature usually rose, with intervals of sleep alternating with restlessness. The symptoms steadily became worse, and coma was followed by death within twenty-four or at most thirty-six hours after the operation. There had been no vomiting, and no abdominal distension, the abdomen remaining flat and soft throughout. On *post-mortem* examination nothing was found, a little serum in the abscess cavity and on the gauze, but *no pus anywhere*.

The deduction which I draw from these cases is as follows:

In endeavouring to treat a disease we should first try to understand how Nature is working for the same end.

After all, Nature has had a far longer experience than any surgeon, and her methods ought not to be lightly interfered with. We may consider that when suffering from an ordinary attack of appendicitis, by which I mean an attack going on to localized abscess formation, there are *three lines of defence* by which the organism protects itself against the bacillus.

The first line is obvious to all—the lymph agglutination of mesentery, intestines, etc., around the appendix, which limits the abscess, and prevents infection of the general peritoneal cavity with pus. It is these adhesions which surgeons are so careful to preserve, and fearful of breaking down.

But, after all, this is only the outer rampart, and if destroyed it is not necessarily a very serious matter.

The second line of defence is a far more important one, and its importance is, I believe, not sufficiently recognized. I refer to the layer of lymph covering the surface of the intestine and omentum, and forming the wall of the abscess cavity. I believe this lymph acts as a filter, allowing soluble toxins to pass through into the lymphatics and blood stream of the surrounding viscera, but presenting a barrier to the passage of bacilli, like the porcelain of a Berkefeld filter.

It is this barrier which it is all-important to preserve until the third line of defence has been established.

The third line is in the blood itself; the passage of toxins into the circulation results in a rise of temperature, quickening of pulse, etc., and the formation of protective antibodies in the serum.

More and more toxin passes through as time goes on, and the abscess becomes larger, until in course of time, generally during the second week of an attack, the temperature may fall to normal, or nearly so, and the serum become saturated with antibodies.

By this time the patient has become protected. If the abscess is opened, foul-smelling pus flows freely over the abdominal wound, which may afterwards be sutured for the greater part of its extent and heal by first intention, without even any sign of redness round the stitches. There is no more danger to the patient than in opening an abscess anywhere else. This seems to be the meaning of the old-fashioned idea of ripening.

But in the cases I have described—and I believe the same thing has occurred in the practice of others—time was not left for the proper development of this third line, and the second line was removed by the too vigorous sponging with gauze, and probably at the same time some infective material was rubbed into the unprotected surface of the abscess wall, as vaccine lymph is rubbed into an unprotected skin in the ordinary method of vaccination—an acute septicaemia resulted, and death was due to an invasion of blood by the bacilli.

If this theory is correct—and I can think of no other satisfactory explanation for these cases—the moral is obviously this:

1. Not to be in a hurry to operate, unless an operation can be performed within the first twenty-four hours, when the mischief is presumably confined to the appendix itself, or where general peritoneal infection is impending or has already taken place.

2. When a definite abscess has formed, wait till after the first week; when about ten days have elapsed it is probable that protection will be complete. During this period the patient should of course be kept under close observation, so that an operation can take place at any time if necessary.

3. Be contented to drain the cavity. Gentle flushing may be employed at the time of the operation if preferred, but do not do more than is necessary for this purpose.

4. Above all things, if operating early, simply evacuate the pus without touching the abscess wall, and leave the appendix to be dealt with at a later date, when all infection has subsided.

Since I have endeavoured to follow out these maxims I have had no repetition of the experience I have related.

DIRECT OESOPHAGOSCOPY.

BY

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Examination of the oesophagus by means of a straight rigid tube is regarded by some medical men in England as a barbarous and dangerous proceeding. If, on the other hand, this method of examination is at all generally used, there is a singular lack of records. This lack cannot be due to the rarity of the occasions on which oesophagoscopy may be supposed requisite, for medical literature bristles with the rare and interesting type of case.

Some are incredulous that it is mechanically possible thus to examine the oesophagus, with its difficult bucco-pharyngeal entrance, its natural curvatures, and its proximity to vital thoracic viscera. Such incredulity is best removed by demonstration. Nor is the professional sword-swallower yet extinct; and, in fact, there is no better way of practising oesophagoscopy than by the aid of such an artist.

Others, not incredulous for anatomical reasons, are deterred by various other considerations from admitting the utility of the oesophagoscope. Thus, the field of vision is too small and distant, the difficulty of illumination too great, the chance of fallacy too serious. Such objections are well founded.

However, the field of vision is extensive by comparison with that of the urethroscope.

As to the best method of illumination opinions vary. If the light is to be reflected down the tube the requisites are adequate brilliancy, condensation, and parallelism of rays. The inner surface of the tube should be dulled. It is a little difficult but not impossible by these means to light up an area of oesophageal wall as far down as the cardiac orifice of the stomach.

The chance of fallacious observation is certainly great, but not more so than is the examination by artificial light of any hollow structure with muscular walls, such as

rectum, bladder, and urethra; and there is no reason why this difficulty should not be largely eliminated in the one case as in the other by experience and by a proper use of probes, sponges, and other appliances for cleaning the area under examination.

The following series of cases in which direct oesophagoscopy was applied is too small to serve as a basis for generalizations, but, as far as it goes, it will help to answer questions as to the safety and practicability of the method. If these questions can be settled satisfactorily, then the indications *pro* and *contra*, and all the other matters that collect about any surgical procedure, are not far to seek.

A very good account of this subject is given in *Oesophagoskopie*, by Professor Hugo Starck of Karlsruhe; see also Professor Killian's writings in the German Laryngological Archives; a discussion of the British Medical Association at Manchester, 1902; the *Journal of Laryngology*, vol. xvii; a paper by Dr. Paterson of Cardiff (British Medical Journal, 1906); and a paper by the author in *St. Bartholomew's Hospital Journal*, vol. xiv, 1907.

To my mind the best indication for oesophagoscopy is that of foreign body, yet not in all cases. Some foreign bodies can be safely left to take their chance of passage; others are better removed by lateral oesophagotomy. But the latter procedure ought to be controlled by oesophagoscopy, if only because it occasionally happens that when the oesophagus has been opened it is found that the foreign body has been passed on to the stomach. In such a case the patient will have been spared a somewhat severe wound. A smooth, rounded article, such as an apple, can be safely pushed on its way with a bougie, in the absence of strictures, but not so an irregular, sharp-edged angular object like a piece of bone or some tooth-plates, which can only be dislodged with safety under guidance of the eye. Lack of the last desideratum is a serious objection to the old-fashioned coin-catcher, and to instruments like Kirmisson's hooks. A few cases are recorded, a great many unrecorded, of laceration of the oesophagus by these instruments. An elongated body, such as a hatpin, has not infrequently been removed from the oesophagus by gastrotomy, but this can equally well be done *per vias naturales*.

It is certain that the lay press gives a truer index of fatalities resulting from foreign bodies impacted in the oesophagus or the air passages than the medical journals. However, 32 cases of foreign body in the oesophagus are mentioned in the medical journals of the last three years. Eight of these cases are given as having had a fatal termination. In seven of the eight there is no mention of treatment, and death seems to have resulted from perforation of the trachea or oesophagus, or other damage done by the foreign body itself. In the eighth case the oesophagus was torn by a coin-catcher. Numerous instances of this latter accident could be collected from the lay press and from *post-mortem* record books.

In 24 of the cases the foreign body was successfully removed. The methods used were: Gastrotomy 1, Kirmisson's hook 1, coin-catcher 5, oesophagotomy 6, vomiting induced by various means 3, passage per anum 2, not mentioned 6.

The nature of the foreign bodies was as follows: (*a*) In fatal cases, tooth-plate 3, coin 2, collar stud 1, mass of paper 1; (*b*) in successful cases, coin 9, tooth-plate 8, toy bicycle 2, brooch 2, piece of meat 2, bed-knob 1.

It will be noted that the same articles appear in both lists. It is also of interest to note the times for which these foreign bodies were retained. They vary from six days to seven months Therefore, although delay is clearly inadvisable, a surgeon has plenty of time to work.

Oesophagoscopy is only mentioned once as having been tried unsuccessfully.

Now although the successful issue of some of these cases is due to brilliant surgery, yet the procedure adopted is either haphazard or in the nature of a severe operation. The contention here is that if oesophagoscopy is simple and safe and practical it ought to be tried in most cases of foreign body.

Strictures of the oesophagus are generally malignant and they sometimes progress with extraordinary rapidity. Very little is known about their early stages and the treatment is highly unsatisfactory. If any advance is to be made, it will assuredly only be done by means of direct inspection at earlier periods in the disease. "Innocent" strictures are relatively uncommon. It would appear nevertheless to be important to have some certain means of making an absolute diagnosis in these cases, as well as in other cases of dysphagia and affections of the oesophagus.

Case I.

Male, aged 52. Three months gradually increasing dysphagia. Great wasting in that time. Can now only swallow fluids, and that with difficulty. Deglutition is impeded. The patient fills his pharynx with the fluid, and then lets it run down by gravity. No enlarged glands felt in the neck. No haematemesis. The pharynx has a scarred appearance, and the epiglottis is slightly misshapen. A history of former syphilis is given. Bougie (12 mm.) stops at 8 in. from the upper incisor teeth.

In this case the history, together with the appearance of the pharynx, afforded a supposition that the stricture might possibly be fibrous or at all events "innocent." It was therefore necessary to see the local condition if possible. As the high position of the stricture made the case difficult if not impossible with an ordinary oesophagoscope, I decided to try first the method of hypopharyngoscopy which I had the pleasure of seeing invented by von Eicken at Freiburg in the summer of 1906.

This method has been described in the *Lancet* for May 25th, 1907, by Dr. Hald of Copenhagen. It consists practically in withdrawing the larynx away from the vertebral column by means of a strong curved probe passed behind the epiglottis and then investigating the pharynx with an ordinary laryngoscope. In this way it was just possible to see the stricture, which showed as a narrow tunnel with what looked like radiating scars running down towards it. Next the pharynx was cocainized and a small oesophagoscope passed down behind the cricoid cartilage. Usually it is almost impossible to retain a tube or any other foreign body in this situation; but this patient was in the habit of doing so, and was thus extremely tolerant. Nothing like ulceration was seen, nor any scars, but the lumen of the oesophagus was contracted in a circular manner, and there were some nodular swellings lying around the field of vision. These felt hard to the probe, and did not yield to pressure. A diagnosis of infiltrating carcinoma was made.

Case II.

Male, aged 48, stated that a piece of meat was stuck in his neck and wished that it should be removed. He was informed that very likely it had passed on, and that what he felt was only the discomfort caused by its temporary impaction. As the patient was uncertain whether the piece of meat contained any bone, and as he desired the examination, I passed a tube of 10 mm. diameter to a distance of 12 in. from the upper teeth. The lumen was seen to be clear, and there was no injury of the mucous membrane.

I was able to demonstrate the walls of the oesophagus below the upper aperture of the chest moving with respiration. This patient was short and stout, and had a very thick neck, but no teeth in the upper jaw.

Case III.

Male, aged 30, had a shilling impacted in the oesophagus, near the cricoid cartilage. Skiagrams showed the coin lying antero-posteriorly. An oesophagoscope was passed down behind the cricoid cartilage, but the shilling was not seen. This patient had a very kyphotic spine and very prominent teeth, and was therefore unsuitable for the operation.

It is almost certain that during the cocainization or later the coin had become dislodged and passed lower down the oesophagus, and so was out of reach of the short tube which the skiagram led me to select. In any case the coin became loose, and was vomited soon afterwards.

Case IV.

Female, aged 35. Chief symptom, vomiting of blood-stained muco-pus, especially during the night. No dysphagia. The vomit contained great numbers of (?) pharyngeal epithelial cells, much mucus, a little blood, some pus, and crowds of bacteria, but no food substance or gastric juice. Skiagrams showed nothing abnormal in neck or chest. There were some crepitations over the upper lobe of the right lung. Dr. S. West made a provisional diagnosis of an oesophageal sinus, due to a suppurating gland, probably tuberculous, having ruptured into the oesophagus. This patient's nose was very wide externally and very roomy on both sides internally, so that the nose and nasopharynx were easy to examine with the rhinoscope. The pharynx was in a condition of chronic catarrhal inflammation, no doubt owing to the width of the nasal cavities. No disease of any of the air sinuses was discovered. An oesophagoscope, diameter 10 mm., was passed a distance of 12 in. without anything abnormal being found.

Here, as in Case II, the oesophageal walls were seen to move with respiration. This patient was examined again under general anaesthesia (see Case VII). She was a stout woman with a somewhat thick neck and prominent though defective upper teeth. It is worth noting that she vomited some 2 oz. of the material above described through the oesophagoscope.

CASE V.

Female, aged 52. History of a few months' dysphagia and great wasting. I had seen this patient six weeks previously with the intention of making a complete examination, but was at the time prevented from carrying it out by reason of failure of the battery. In the interim gastrostomy was performed, with the result that the patient looks very much better. She has put on weight, is much less anaemic, and can swallow solid food. An oesophagoscope 36 cm. long was passed its whole length without anything abnormal being seen.

This patient had very prominent upper incisor teeth, but no upper molars, and the tube, when in position, lay in the left angle of the mouth, the head being slightly tilted towards the right shoulder. Air rushed up and down the tube in a curious way, probably owing to the presence of the gastrostomy opening.

The nervousness and weakness of this patient prevented further examination, and I recommended general anaesthesia. It is a matter of regret that I did not try to see the lower part of the oesophagus from below—that is, through the gastrostomy wound.

CASE VI.

Male, aged 58. For six weeks has had definite difficulty of swallowing, which has steadily got worse. Can now only swallow fluids. Has not lost much weight, and does not look ill or wasted. Teeth very defective. Pharynx natural. No glands felt in neck. A sound, diameter 24 mm., stopped at 9 in. from the teeth. A sound, diameter 12 mm., passed into the stomach. An oesophagoscope, diameter 12 mm., was passed a distance of 9 in., and showed a narrow stricture with rigid nodular walls, but no ulceration. A diagnosis of rapidly advancing carcinoma was made.

CASE VII.

Same patient as Case IV. The symptoms above detailed persist. Examination under chloroform. Position of patient: flat on the back, with head projecting beyond the end of the table, and supported by an assistant. The tube was somewhat difficult to pass, but without force of any kind finally reached a distance of 14 in. from the teeth. The head had to be turned sideways, so that the tube lay in the angle of the mouth. The oesophagus at 14 in. was seen to pass obliquely to the left, so that only the right anterior wall was visible. At this stage brownish fluid appeared round the curve in the oesophagus, filled the lower part of the tube, and was presently vomited. It had the same characters as the fluid described under Case IV *supra*. The field of vision was now dried with swabs of cotton-wool. Next the tube was very slowly withdrawn, and folds of mucous membrane kept coming into view. No sinus, growth, ulcer, or pouch was seen, and the oesophagus in this case did not seem to have any air-containing lumen except at its very lowest part, which therefore may have been dilated, and thus the cause of the symptoms. Half way through the examination the gag slipped and caused a little anxiety. The conclusions from this case are that if general anaesthesia is used it should be complete, that for the dorsal position the table should be perfectly flat, that special care of the gag is essential, and that good assistance makes matters safe.

This case was on the whole the most satisfactory, because it showed conclusively that it is possible to examine thoroughly the whole length of the oesophagus in this manner.

CASE VIII.

Female, aged 70. Edentulous; extremely wasted; cannot swallow solids; sound stops at 10 in. from the teeth. Examination under chloroform. An oesophagoscope, diameter 12 mm., was passed nearly 10 in. The stricture was clearly seen, and also the upper border of an ulcer with hard, nodular margin. A diagnosis of ulcerating carcinoma was made.

From a diagnostic point of view this case was very satisfactory. It would have been easy in this, as in the other cases of growth, to remove a piece for microscopic examination had it been deemed necessary.

These eight examinations were made on patients varying from 30 to 70 years of age, four males, three females. Two of them took place under general anaesthesia; the rest had no anaesthetic, or only a little cocaine brushed over the pharynx. They show that oesophagoscopy is safe and practical, at all events in these eight consecutive cases picked at random.

As regards anaesthesia, a sensible patient can be of great assistance to the surgeon if he be conscious. He can swallow when directed to do so, he can alter the position of head or neck as required, and his sensations are to some extent a safeguard against damage. For these reasons a beginner should probably not have the patient under a general anaesthetic. But general anaesthesia spares the patient a certain amount of discomfort, and, what is very important, admits of a more leisurely examination. In the two cases in which chloroform was used, prolonged inspection of the oesophagus was easy, and normal and abnormal structures were demonstrated to students and others, after thorough cleansing of the field of vision.

Two patients complained of slight difficulty of swallowing as an after-effect, lasting a few hours. In one case this could fairly be attributed to the cocaine used; in the other it was due to slipping of the gag and bruising of the base of the tongue.

The technique in each case was much the same. Sometimes the obstruction, if any, was first located with a bougie. The chest was thoroughly examined by ordinary physical means and skiagrams of neck and chest were made in all cases, whether for the location of growths or foreign bodies or for the detection of extrinsic pathological conditions such as aneurysm or mediastinal growth.

A guide for passing the instrument is not essential, and obviously cannot be used in cases of high-placed stenosis. If, however, the part to be examined was known to be well within the chest, a flexible bougie loosely fitting the tube was chosen and placed in the tube in such a way that about 2 in. projected from the distal end. It is better to have a loosely fitting bougie, because otherwise it may require a good deal of force to withdraw it, on account of the production of a partial vacuum below it. The projecting part of the bougie (where this was used) and the adjacent 2 in. of the tube are lubricated with some moist substance such as vaseline or paraffinum liquidum.

The easiest way of entering the oesophagus is to place the end of the instrument in a sinus pyriformis, whence it glides naturally into the oesophagus, but occasionally requires the assistance of deglutition. As soon as the end of the tube is within the upper aperture of the thorax the bougie is withdrawn and the rest of the operation carried out under the control of inspection. If difficulty is encountered, no force whatever is used. The exact position of head, neck, jaws, and vertebral column has to be found for each case. Thus, at one time, by extending the head a little more or a little less, at another by turning it laterally towards one or other shoulder, at another by a combination of these positions, and so on, an apparently insuperable obstacle disappears and the tube passes easily downwards. In a certain proportion of cases it is physically impossible to carry out these manœuvres, but that is no reason for discarding the thing altogether.

In view of the great obscurity surrounding diseases of the oesophagus and the unsatisfactory results of the treatment at present applicable to them, it is contended that a wider use of the oesophagoscope is safe and practicable, and could not fail to produce advances in surgery.

Much of what has been said about foreign bodies in the oesophagus applies also to the use of the bronchoscope in cases of foreign body impacted in the trachea or bronchi.

NOTE.—In the period that has elapsed since this paper was written various improvements have been made in the instruments. In the cases here described I used Killian's original instrument. Recent developments have rendered oesophagoscopy simpler and more efficient.

FROM an advance programme to hand we gather that those who take advantage of the arrangements made for holiday cruises by the Yeoward Brothers Line, and leave Liverpool on September 24th, will arrive in Portugal in time for the autumn meeting of the Royal Sporting Club of Portugal. It lasts a fortnight, the events including an amateur bull fight, cross-country races, pigeon shooting, horse jumping, and a competition for the lawn tennis championship. One or other of the ships of this line apparently leaves Liverpool every week from August 20th to November 12th. The round voyage to Portugal, the Canary Isles, and home, lasts some twenty-three days, the fares ranging from ten to twelve guineas. It would appear that passengers are at liberty to break the voyage at discretion.

SEVENTY-EIGHTH ANNUAL MEETING

OF THE

British Medical Association.

Held in London on July 22nd, 23rd, 25th, 26th, 27th, 28th, and 29th.

PROCEEDINGS OF SECTIONS.

SECTION OF RADIOLOGY AND MEDICAL ELECTRICITY.

J. MACKENZIE DAVIDSON, M.B., C.M., President.

PRESIDENT'S INTRODUCTORY REMARKS.

AFTER a few initial observations, Dr. MACKENZIE DAVIDSON said: I should like to take this opportunity of making some remarks upon the importance of *x*-ray examinations and treatment being conducted by medical men properly equipped for the task; and, incidentally, I may observe that the day will come when medical men who now employ laymen to do this work will regret the precedent they have established.

The precise information afforded by *x* rays is often not taken advantage of by surgeons and physicians. No doubt other *x*-ray workers who are present will recall, as I do, many instances of disasters due to ignoring the valuable help that could have been given by the timely employment of *x* rays. More than this, it is equally important that those who engage in this kind of work should take care to learn proper scientific methods, such as the exact localization of foreign bodies, especially valuable in eye injuries. They should also thoroughly understand stereoscopic methods.

It was once reported to me that a surgeon to a large London hospital had made the remark that it was absurd to talk of an "*x* ray expert," as the matter was so simple that you only had to put an *x*-ray tube on one side of the patient and a plate on the other; and while this is an extreme instance, I am bound to say that there are some grounds for regretting that many of our colleagues do not realize the dignity and importance of this branch of the medical profession—beset, too, with special anxieties and risks—to which some of us have devoted our lives.

Many years ago, when first we learned the injurious effects produced by prolonged exposure to *x* rays, I described to the Roentgen Society a simple method of enclosing the tube in a wooden box coated very thickly with a mixture of red and white lead, and having a suitable opening for the exit of the rays. I also made casts to go round the tube of plaster-of-Paris mixed with red lead, which were effective in screening the operator. It is a matter of great regret that some of the early workers with *x* rays did not employ some such effectual means for protecting themselves and their assistants from injury. In this connexion it will interest you to know that superficial *x*-ray dermatitis can be cured by means of radium. Another precaution which I adopted at an early date was to glaze the frame of the fluorescent screen with very thick lead glass, this not only protecting the screen and allowing tracings to be made from the *x*-ray picture, but also protecting the observer.

And now a few words on the subject of radium. There is probably no remedy which has ever raised such widespread interest, or, I am bound to add, excited such exaggerated hopes; and these exaggerated hopes have had the curious effect of greatly hampering us in our experiments; for in May, 1903, when I cured a large rodent ulcer on the face (which I may say in parenthesis has not recurred), the price of radium was 8s. a milligram, but as soon as a rumour that it could cure cancer got abroad, the price rose rapidly, until it has now become almost prohibitive, as much as £20 a milligram having to be paid for it. There is no doubt that this enormous rise in price has been due to the widespread belief that radium had been found to be a cure for cancer, and being bought in large quantities for that purpose, it has prevented many medical men from obtaining it and using it in the treatment of other diseases for which it has been proved to be a cure.

I have seen many cases of carcinoma treated by radium, but I have never seen one that has been cured by it; and it has also failed to cure some cases of *severe* rodent ulcer. In short, its utility in the treatment of malignant diseases, so far as our present experience goes, is very limited. No doubt its beneficial action in some glandular hypertrophies, and in some cases of what appear to be round-celled sarcomas, has given rise to over-sanguine hopes that it might prove to be somewhat of a specific for malignant diseases of all kinds. However, we are fortunate on the present occassion in having Dr. Dominici, of Paris, present with us, and we look forward with much interest to his exhibition of specimens and patients, and to hear from him what results the large amount of radium at his disposal has enabled him to obtain.

But if radium has not, so far, fulfilled all the hopes that were entertained of it, it has, at any rate, accomplished something, and it is encouraging to turn for a moment to a new field of experiment in which it has yielded good and definite results, namely, certain diseases of the eye. Here, again, the diseases in which it is potent are *superficial*. So far as we have tried it in deep-seated diseases, the results are negative. On the other hand, in some external diseases of the eyes and eyelids, its action is very remarkable, and I feel sure that radium will take a high place in ophthalmic therapeutics. By way of example I may instance 5 cases of spring catarrh which I have cured by radium. The first of these was cured four years ago, and there has been no recurrence. Some of the cases were extremely severe, and one of them, of over six years' standing, had undergone a great variety of treatment, both operative and otherwise, without any permanent benefit. And besides these, in cases of episcleritis, hypopyon ulcers (corneal ulcers generally), incipient interstitial keratitis, and even in bad cases of pterygium, extraordinarily good results have been obtained.

ROENTGEN RAYS IN THERAPEUTICS: A SUGGESTION FROM A PHYSICIST.

By Sir J. J. THOMSON, D.Sc.,

Cavendish Professor of Experimental Physics, Cambridge; Professor of Physics, Royal Institution.

AFTER referring to the circumstances by which he, a physicist, was induced by the President of the Section to deliver an address on this occasion, Sir J. J. THOMSON, who had no manuscript, said:

You, Sir, announced that I was about to give an address upon the application of the Roentgen rays in medicine. Nothing of the kind. I have no knowledge about the practical application of this subject to disease. But in thinking over what particular subject I might do least harm in speaking upon, it occurred to me that there have recently been some developments with the Roentgen rays which may have important bearings upon medical science and the application of these rays to the purpose of curing disease. Every one is aware, of course, that there are all kinds of Roentgen rays. There are soft rays—meaning rays which cannot penetrate very far through solid substances—and there are hard rays, which have a great power of penetration, and are used principally for what we may describe as purposes of exploration. I will not deal with the hard rays on this occasion. They are the rays which are used for taking the ordinary Roentgen photographs. But I will begin by recalling to your mind the different physiological effects that might be expected to be produced by the hard rays and the soft rays respectively. On the one hand we have the hard rays—rays which can pass through the body without suffering any very enormous diminution—and on the other hand we have the soft rays, which are absorbed within a depth from the surface of the skin to be measured only in hundredths of a millimetre. The physiological effect of the different rays, we may roughly suppose, is proportional to the amount of energy which is absorbed in the tissues. Now, in the case of these hard rays, there is comparatively little absorption, and therefore in any given portion of the body there is little physiological effect. But in the case of these very soft rays, which are absorbed more easily even than the beta rays of radium, the whole of the

energy is taken in by a very thin layer of the flesh, which thereby becomes exposed to a most vigorous physical agency. Chemical change may be expected to take place in that thin layer, and the physical and physiological effects produced by these very soft rays must be enormously greater than those produced by the hard rays.

The deleterious effects, of which there have been so many instances, and the curative effects also, which have followed the Roentgen radiation, have really been due to the rays of the soft and readily absorbed species. It is very important to get rid of these soft rays when we are using Roentgen rays for the purposes of exploration. In that case the soft rays are only harmful, and I have no doubt that all these terrible results which some men have suffered have been due to the fact that in the earlier stages of the manufacture of tubes a considerable amount of these soft rays was absorbed by the surface layers of the flesh, the skin, and so forth, producing very deleterious effects. But it is evident that for the purpose of curing disease this absorption of energy is what we require. Therefore, it is very important that for a purpose of this kind we should have as suitable and efficient a means of producing very soft rays as possible. It is, I think, unwise to use for what we may call curative purposes Roentgen bulbs that approach in hardness those that are employed for photographic purposes. When using these hard rays practically the whole body is exposed to the same influence, and to a layman this procedure looks rather like flogging the whole school because one boy has committed a fault. Parts of the body other than the one concerned are irradiated. For this reason we should realize the importance of developing the methods of producing very soft Roentgen rays, as well as the very hard ones for use in photographic purposes. The matter is important also because, so far as evidence goes at present, it shows that if we get a certain amount of absorption of energy, either by the Roentgen rays or by the beta rays from radium, the effects produced are very much the same. And if we can produce Roentgen rays which are as easily absorbed as the beta rays we have probably a method of treatment at our command which will produce all the effects that are to be produced by radium and in much less expensive way.

The production of these very soft rays directly from a Roentgen tube is a matter of very great difficulty. We know that a Roentgen tube consists of glass of considerable thickness, and that this thickness of glass is quite sufficient to filter out the rays which, we might have hoped, would have been most beneficial for medical purposes. It is true that we may use tubes with aluminium windows, but with any kind of window that would bear the pressure the best rays are absorbed on their way out. We have, therefore, to cast about for some other way of producing the very soft Roentgen rays which are probably the most valuable ones for curative purposes.

It is a recent discovery bearing on this point that I wish to bring before you this morning. A former pupil of mine, Professor C. G. Barkla, now of King's College, London, has been experimenting on the effects produced when Roentgen rays of any ordinary type strike against a metal. It has long been known that, when the Roentgen rays strike against a metal, that metal emits secondary rays. But the essential point about this outgo of secondary Roentgen rays from the surface of the metal was not known until Professor Barkla made his important discovery. This discovery is that when a piece of metal or any substance—it does not matter whether it is metallic or not—is struck by Roentgen rays that substance gives out Roentgen rays of a special quality. For example, if we expose iron to Roentgen rays, the iron gives out one particular kind—a perfectly definite kind—of Roentgen radiation. It does not matter what the quality of the rays that strike it, the iron gives out a constant kind of Roentgen radiation. If we take another metal, say copper, we find that this also gives out a definite Roentgen radiation, and one that is quite different from the one given out by iron. Silver, too, when struck by these rays, emits rays of another and definite quality. And in all these cases the quality of the incident ray—its degree of hardness—does not matter. Whatever it is, the quality of the ray given off by the metal is constant. In this manner we have a definite means of reproducing Roentgen rays of a specific type.

There is one interesting point, scarcely of the nature of an exception, but an important thing to be remembered in connexion with this discovery, namely, that in order to enable the metal to give out its particular ray the incident radiation must be harder than the radiation characteristic of the body. If we take a very soft radiation and allow it to fall upon a metal of high atomic weight—lead, for example—it will not excite the radiation of that metal. In order to excite the lead radiation, we must have it exposed to rays which are harder than those rays which are given out by the lead; but with that proviso, the quality of the ray given out by a metal is perfectly definite. It depends only upon the metal, and not upon the nature of the ray that must be used to excite it.

The quality of the secondary ray depends upon the nature of the metal in a very simple fashion. The hardness of the ray given out by a metal increases as the atomic weight of the metal. It has not yet been found that metals of lower atomic weight than calcium give out any of these rays. They simply scatter the incident radiation. But when we come to metals of higher atomic weight than calcium—to iron, copper, zinc, silver—we have their characteristic radiation. By using these various metals it is possible to get a scale of Roentgen radiation of enormous extent. I will take the case of iron. The radiation from iron would be absorbed, I calculate, by a one-hundredth part of a millimetre thickness of human flesh. If we allowed our Roentgen radiation to fall upon a piece of iron, and projected all the rays given out by the iron on to the flesh, the whole of the radiation would be absorbed within one-hundredth of a millimetre from the surface. Probably this is comparable with the absorption of ultra-violet light. If we go further and take copper, we shall find the radiation falling a little deeper, but still only to the fraction of a millimetre. If we take silver, we find it giving out a radiation which is quite comparable in regard to the depth it penetrates with the beta radiation from radium. The same amount of it would be absorbed close to the surface as with the beta ray. And I suppose—I am only speaking as a layman—that all the effects which are produced by radium treatment are due to the beta rays of radium, and therefore it is useful to know that the secondary rays from silver have just about the same penetrating power as these. It may be just a little greater in the case of the beta rays, but nothing, I think, that would count. If, now, we take tin, of higher atomic weight than silver, we get more penetrating radiation. If we take iodine, we find it still more penetrating—so penetrating that it is difficult to get a bulb to give hard enough rays to excite it. It is only a specially prepared bulb that would be capable of it.

Thus by using these different metals we can graduate and reproduce at any time types of Roentgen radiation, from the very softest—that from iron, which can only affect the surface of the skin—to such radiation—through iodine, for example—as would go through the surface of the body. And by using the radiation from silver we shall obtain practically the same penetrating power and absorption as that given out by the beta rays of radium. Now, would it not be possible for medical purposes to use the radiation given out by these metals instead of trying to produce soft radiation by specially constructed Roentgen bulbs? We can produce radiation from silver by exposing the metal to a tube, and it does not matter what the quality of the tube, because all tubes give out sufficiently hard rays to excite silver.

One other point may be of interest to some people who wish to work upon research of this kind. There is a very peculiar difference between the amount of energy absorbed by hydrogen and by other substances. The ratio of the amount of energy absorbed by hydrogen to that absorbed by carbon or oxygen depends very much upon the quality of the ray. For example, with the very soft rays that are given out by iron there is practically no absorption by hydrogen. They can go through the hydrogen without being affected. But as we increase the hardness of the ray the proportion of energy absorbed by the hydrogen increases also. My point is that in the laboratory we have here an instance in which one kind of substance is specially affected with reference to another by the quality of the ray. It is possible, I think, that diseased tissue may differ in chemical combination from healthy tissue, and in one of the cases we may get a larger relative absorption than in another. We may obtain a kind of ray which would be greedily absorbed by the tissue we wish

to affect, and not absorbed to anything like the same extent by the normal substance. It seems to me that there are possibilities in this direction which may lead to results of medical importance.

Just one other remark in dealing with these different qualities of rays. If we wish to extend the radiation to a certain depth of tissue, we have a special quality of ray at our command suitable for that depth. We cannot use iron rays with the hope of affecting a part 2 mm. or 3 mm. below the skin. Nor is it of any use to employ very hard rays indeed in such a case, because they would go through with so little absorption that there would be no effect. But there is a certain quality constant to each particular depth we wish to reach, and we can select from the scale of metals, and produce rays appropriate to that depth.

[Speaking later in response to a warmly accorded vote of thanks, Sir J. J. Thomson said that a point that struck him in his study of this question was that people ought to be careful in the use of metals they adopted as shields. Iron and copper, which gave out all the soft rays that would do most injury, were most dangerous as shields.]

A SCREEN FOR EXAMINATION IN THE UPRIGHT POSITION.

By C. THURSTAN HOLLAND, M.R.C.S., L.R.C.P.,
Honorary Medical Officer, Electrical Department, Royal Infirmary, Liverpool; Honorary Medical Officer, X-ray Department, Children's Infirmary, Liverpool.

THERE is great difficulty in arranging efficient protection for the *x*-ray operator in making the examination on the screen of chest cases and stomach cases in the upright position.

It is scarcely necessary for me in a paper of this description to emphasize the fact that the standing position for the examination of the stomach, and the standing or sitting position for the examination of the chest, are all-important in *x*-ray work.

A long experience of hospital work, where it is the routine for the various physicians to come down to the *x*-ray room with students in order to demonstrate such cases on the fluorescent screen, has convinced me that the ordinary methods of protection, not only for the *x* ray demonstrator himself, but also for the physician and his classes, are quite inadequate and inefficient.

Usually we see some sort of box around the tube which has a diaphragm in front, close up to the tube-box, and to alter the diaphragm the hand has to be brought into close proximity to the tube-box. With the very active tubes in use at present, even with *x*-ray gloves on, it is not a safe procedure to be constantly bringing the hand close up to the box whilst the tube is in active use inside.

In front of such a box stands the patient, and on the other side of him is the screen, usually with lead-glass in front of it, and sometimes supported in a frame of some kind. Even if there is a small lead-lined screen below the screen and in front of the patient, this is quite inadequate to protect more than one or two persons, and if the patient has to be turned into different positions while being screened, the operator must almost necessarily bring his glove-covered hands round this screen in order to handle the patient. Experience has taught me that the doing of this, although gloves are worn, and although by means of the diaphragm in the tube-box only a portion of the screen is illuminated, involves exposure of oneself to so many rays, secondary and otherwise, that, in my case at any rate, if I examine a few patients in this way during an afternoon, my hands burn and feel uncomfortable all the evening, and often the next day.

Now, if this is true of tubes made active by an ordinary coil, it is doubly so when one is making the examination in front of a tube actioned by such an instrument as the Snook transformer, and the penetration of the rays coming from a tube with a large Snook current going through is so great that it is impossible to do more than protect to a certain extent.

These considerations, and the using of the Snook transformer very largely for making screen examinations with a large current, induced me to devise an apparatus which, whilst at the same time being more efficient from the point of view of protection, rendered it quite easy to handle the patient under observation.

The essential features of the screen are: (1) That it is placed between the tube and the patient, and not between the operator and the patient; (2) that there is a diaphragm in the screen itself, which can be made to any size by means of pulleys on the safe side of the screen; (3) that it affords a protection to a large number of people standing in front of the *x*-ray tube, and that there is a wall of lead between them and the tube, which is only broken at the spot where that portion of the patient under examination is being investigated.

The screen itself consists of an upright shield, 6½ ft. long and 6 ft. high, made of two layers of wood with sheet lead, 4 lb. to the square foot, enclosed between the layers.

This screen is on castors, and can be moved easily about an *x*-ray room. Cut at a convenient height—40 in. from the ground at the lower border—in the middle of the screen is an opening, 24 in. high by 18 in. broad, which can be closed either by a thin wooden board against which a patient can lean, or by a lead-glass window, in case the screen is being used to screen off any portion of the room. The operator can stand behind this window whilst radiographs are being taken or treatment carried out—that is to say, the tube can be viewed through the lead-glass.

On the tube side of the screen are four panels, also with lead between wood, each working separately from the safe side of the screen. The two side ones can be drawn upwards and outwards; they run on ball bearings and close down by their own weight, and they are fixed inside by cords, and so an upright opening can be made of any desired size. The up and down panels are counterbalanced by weights, the latter being on the safe side of the screen, and they can also be wound up and down to any required place. Then for the safe side of the screen the four panels can be easily arranged in any sized four-side opening, and form an efficient diaphragm between the tube and the patient. In order to get even more protection, and also to shut out light, the tube is enclosed in an *x*-ray-proof box behind the screen, and this can also be diaphragmed in the usual way.

The tube box I use is on a wooden frame, which can be fixed by its upper and lower parts to the screen; pulleys attached to the tube-box run over the top of the screen, and the tube in its tube-box can be raised and lowered from the safe side and fixed at once in the desired position.

By taking out the wooden sheath before commencing it is quite easy to see that the anticathode is brought exactly in the middle of the opening, and in making the usual examination it is found to be easier to keep the tube in position and move the patient higher and lower or from side to side as desired.

The screen, with the best lead-glass in front, is mounted on two metal rods, which are bent at a right angle and will allow of upward and downward movements.

The patient can be raised or lowered by various means, such as a platform which will move up and down with a screw. There are other obvious ways of doing this, and also of moving the patient across from side to side.

A slot is provided in the screen frame, so that a plate can be slipped between patient and screen when a plate exposure is to be made, and thus the appearances can be seen.

The cost of the screen is not very great, but of course a thing of this size cannot be made for nothing. The lead alone costs between £4 and £5. The one I had made was made in the hospital itself by a carpenter engaged for the purpose, and thus cost his wages and the price of the material. The total was about £10. However, this is a very small matter when compared with our safety, and whilst we have all been very anxious to devise means of protecting ourselves, I do not think that so far any attempt has been made adequately to protect physicians and students who are in the habit frequently of making the screen examination.

[The paper was illustrated by means of a small model of the screen in question.]

DISCUSSION.

Mr. J. HALL-EDWARDS (Birmingham) said that, while admiring Mr. Thurstan Holland's device, there were several screens already on the market which appeared to carry out all the necessary requirements. He preferred a tube the centre of which moved with the screen itself, and if such a tube were well protected with a heavy diaphragm made of lead, he thought that the area covered by the screen was

protective all round. With such an apparatus he had felt no ill effect, although he was now so sensitive to the x rays that, on entering a room where there was a tube in action, he felt them before he knew by sight or hearing that they were being emitted. Mr. Holland's screen had a little advantage over the others in one direction—namely, that, unlike some of the screens on the market, it did protect below the knee. It was very necessary, if there were any scattered rays, that the whole of the body should be protected. No precautions for protection could be too severe.

Mr. Thurstan Holland, in reply, said that personally he did not consider that any screen at present made was suitable for hospital work. The commercial screens were quite adequate for one or two men examining a patient, but when it came to four or five students in addition there was no screen which gave adequate protection to them all

DEMONSTRATIONS.

ELECTRO-PATHOLOGY.

By Dr. S. Jellinek,
Privatdocent to the University of Vienna.

Dr. Jellinek, who spoke without the assistance of manuscript, first expressed his appreciation of the invitation extended to him to take part in the proceedings of the

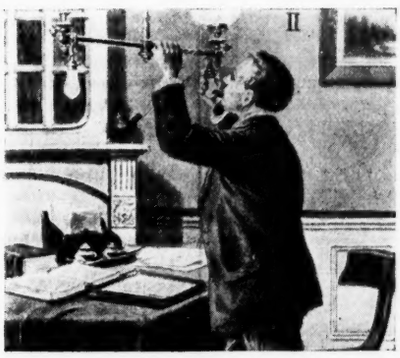

Fig. 1.—An accident arising from a defective electrical installation. The victim laid hold at the same time of an electrical lamp and of a metal gas chandelier. The insulation being imperfect, he received a shock rendering him unconscious for a short time. The current was on the five-wire system (Fig. 3, *b*), and the pressure between lamp and gaspipe at the moment of accident was 330 volts.

Section, and then gave a brief description of the dangers of the electrical current; he also illustrated by means of the epidiascope the pathological changes which the

Fig. 2.—An accident to a girl who, while bathing in a metallic tub, seized an electrical stand lamp (Fig. 3, *a*), the stand of which was insufficiently insulated. Death resulted, being due probably to the immediate arrest of respiration; and there were indications on the body of extensive electrolytic and electrothermic effects. The current in this case also was on the five-wire system (Fig. 3, *b*).

current produced. The question as to the cause of accidents in industrial electricity appeared simple, he said, but in reality it was complicated, and he was not able to demonstrate its apparent caprice better than by saying that whereas one man who had come into contact with 10,000 volts was not killed, another who had touched a current of 100 volts was killed immediately. The difference in the action of the electrical current with regard to different individuals and in different sets of circumstances could be better understood when they remembered that they had to deal with a number of factors in two categories.

In the first place the occurrence and the gravity of an accident depended upon the external circumstances—that

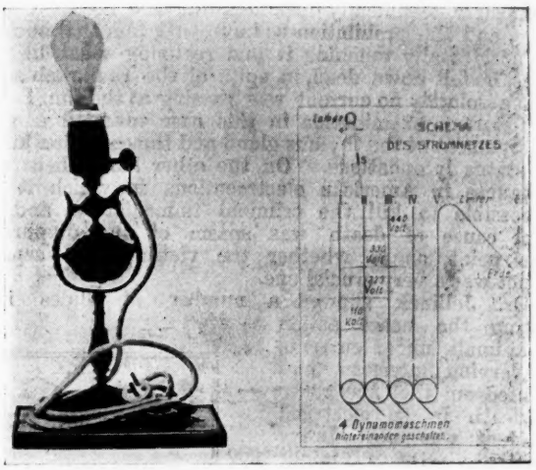

Fig. 3.—*a*, Electrical stand lamp, which was seized by girl in bath (Fig. 2), the stand being insufficiently insulated. *b*, The current scheme, or five-wire system, which was employed in the case of accidents illustrated in Figs. 1 and 2.

is, the electrical installation—and, in the second place, it depended upon certain individual circumstances relating to the particular victim.

The danger of an electrical current was expressed generally by the number of volts, but it depended also upon the ampèrage, the manner in which the contact was made, and the duration of the time of the contact. As to the voltage, it must be said, after their experience of certain accidents, that the current of 100 volts or thereabouts by which electrical lamps were fed was dangerous—indeed, that a current of 50 volts might be considered unsafe. Mortal accidents had occurred in Austria with currents of 160 volts, and in Germany a man was killed even with a current of 65 volts. As to ampèrage, technicians stated that one-tenth of an ampère would produce death; but, of course, in their

Fig. 4.—Occasionally a broken telegraph or telephone wire becomes charged with the trolley currents, with severe effects upon the victim. The wire may be cut, as shown in the illustration, by means of a nipper having insulated handles; but this must be done with caution on account of the blinding effect of the momentary arc which is formed between the separated ends of the wire.

medical experience, they had seen cases in which persons had endured more than one ampère without fatal result. Among the individual conditions, the first to be noted was

the path which the current took through or over the body and the surface resistance of the body itself. The misfortunes which had attended some American electrocutions were brought about by neglecting the direction which the current would take through the victim's body. The current always sought, not the shortest way, but the path of lowest resistance. Another factor too often neglected was the physical and mental condition of the victim at the moment the contact was made. It was a matter of some importance as to whether a person touched a "live" wire by a deliberate intention or was surprised into touching it. He related a case in which a labourer, technically unskilled, was told not to touch a wire, and the prohibition so impressed him that one day, on accidentally touching it and realizing what he had done, he fell down dead, in spite of the remarkable fact that absolutely no current was passing at the time! The *post-mortem* examination in this case revealed a great enlargement of the thymus gland and the condition known as status lymphaticus. On the other hand, there were instances in American electrocutions in which it was impossible to kill the criminal immediately, and the final cause of death was spasm of the diaphragm. The point as to whether the victim was surprised or not was a very crucial one.

Dr. Jellinek showed a number of slides illustrating the heart action in animals under currents of varying intensity, and pointed out that the cause of death in an electrical accident was not always constant. Death might occur through paralysis of the heart or through stoppage of the respiration. In some cases after receiving the shock the victim had been known to be able to get up and talk about his accident, falling down dead subsequently. The difference of sensibility to electrical currents on the part of animals was very great. In Vienna they had experimented upon about ten different species. The horse was killed immediately, about 100 volts being sufficient; dogs were almost equally sensitive; a rabbit was able to endure a higher voltage, and he had been quite unable to kill a frog by means of the current. He considered that, volt for volt, the direct current was more dangerous than the alternating.

He showed many examples of the characteristic electrical burns, which, he said, must be distinguished from the common burn. The true effect of electrical shock was seen in special lesions of the skin having an entirely different pathology from that of the ordinary burning, together with the important difference that they were quite painless. The clinical symptoms differed a good deal. Microscopical haemorrhages of the brain were found in many cases, and this point had an interesting bearing upon first aid in electrical accidents. Too often after a mishap of this kind the victim was laid down with his head low. This was very dangerous. It had been found out by animal experiments and by examination of the brain in the case of persons killed by electricity that these microscopical haemorrhages were in existence, and, the head being lowered, their volume was increased. The head should be elevated, and he also advised in first aid the puncture of the spinal cord, artificial respiration, and venesection.

Since the study of this subject had been taken up in the University of Vienna the number of accidents had greatly decreased, and he had now very little to work upon. He urged that people, especially the workmen in electrical undertakings, should be instructed by means of good pictures, illustrating clearly the origin of accidents, their consequences, and the means of avoiding them. In conclusion he presented to the British Medical Association his *Atlas der Elektropathologie*, containing more than two hundred figures, most of them in colours, exemplifying the effects of electricity upon animal and other tissues.

THE TECHNIQUE AND RESULTS OF RADIUM-THERAPY IN MALIGNANT DISEASE.

BY

H. DOMINICI, M.D.Paris,

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AND

A. A. WARDEN, M.D.Glasg. and Paris,

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[WITH SPECIAL PLATE]

THIS demonstration was given on behalf of Dr. Dominici by Dr. Warden, who said that in accepting the responsibility and privilege of interpreting for Dr. Dominici, he had to express the latter's appreciation of the honour which the Section had done him in asking him to take part in the proceedings. Although unable personally to give any address, owing to his ignorance of the English language, Dr. Dominici had none the less made a great effort to collect for demonstration a series of cases typical of certain classes of tumours, and each illustrating important points in radium-therapy.

Nine cases were referred to in detail, with such evidence as could be given by means of wall-charts and photographs, microscopical sections, etc. In five cases the patients had themselves braved the Channel crossing in order to be present to bear testimony to their condition. In all of them the tumours were grave and of rapid growth, and were either considered inoperable by the surgeon or the operative procedure suggested had been declined by the patient. In all but one case—Case I, the haemolymphangioma—the tumour was of a malignant type. All showed under treatment a local regression, which, if the word "cure" was not permissible, at any rate left nothing to be desired. One case—a patient shown with the malignant abdominal metastatic growths following removal of the testicle—was still under operation and undergoing treatment.

DESCRIPTION OF SPECIAL PLATE.

CASE I.—Haemolymphangioma of neck. Before and after treatment.

CASE II.—Lymphadenoma of parotid. Before and after treatment.

CASE VI.—Epithelioma of mucous membrane of lower lip. Before and after treatment.

The following is a summary of the remarks made on each case demonstrated:

CASE I.

Haemolymphangioma of the neck—a non-malignant tumour, but grave and inoperable, on account of its rapidly increasing size and tendency to haemorrhage.

In July, 1909, the patient, a baby 4 months old, presented a tumour like an enlarged lymphatic gland in the neck, which by October had enormously increased, measuring 3 in. to 4 in. in antero-posterior diameter, and 3½ in. in elevation. The principal cyst was incised, and a tube of silver five-tenths of a millimetre in thickness, 4 cm. long, and 4 mm. in breadth, containing 0.05 cg. of pure sulphate of radium, giving an external activity of 21,000, was introduced and left *in situ* for twenty-four hours, with the result that in seven weeks the tumour had entirely disappeared, and since December, 1909, had shown no sign of recurrence. Full details of this case have been published.[1] One large drawing (shown) revealed blood vessels and lymphatic vessels in a stroma of fibrous connective tissues, and enlarged photographs showed the appearance of the infant before treatment had been begun as well as after. (See Special Plate.)

CASE II.

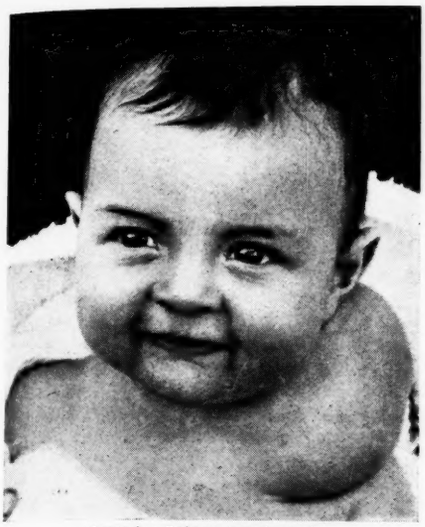
Lymphadenoma of the parotid. A patient considered inoperable by three surgeons, and treatment begun in November, 1908. A gold tube five-tenths of a millimetre in thickness and containing 0.005 milligram of bromide of radium (giving an activity of 5,400) was introduced, through an incision, and left in for four days. In five weeks the tumour had almost entirely disappeared—entirely in seven weeks. Wall-charts showed the new-formed lymphoid tissue resulting from the connective tissue transformation of the parotid gland. The glandular tubes are separated by masses of lymphoid tissue. The patient was shown before the Section. The affected side of the face appeared, indeed, thinner and flatter than the other, owing no doubt, to a certain amount of atrophy of the facial muscles. See Special Plate.)

CASE III.

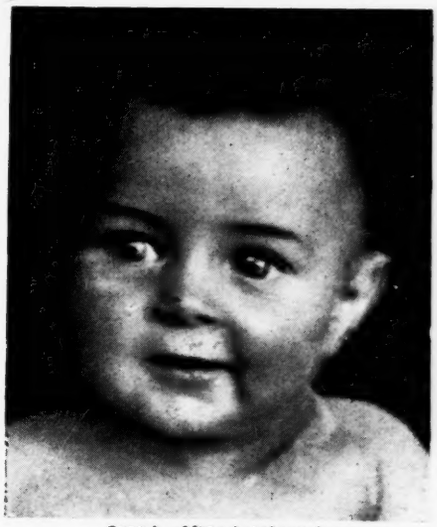
Sarcoma of the mucous membrane of the upper jaw. A patient in Professor Gaucher's ward in St. Louis Hospital, Paris. Photographs showed the disappearance of the tumour,

[1] *Bull. et mém. de la Soc. Méd. de Hôp. de Paris*, May 13th, 1910.

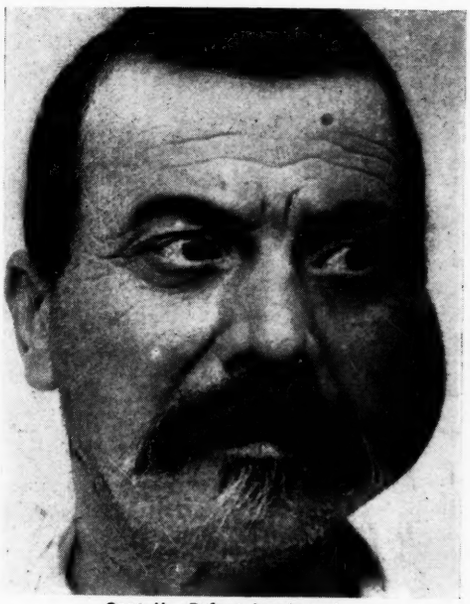
ILLUSTRATING DRS. DOMINICI AND WARDEN'S PAPER ON THE RESULTS OF RADIUM-THERAPY IN MALIGNANT DISEASE.



Case I.—Before treatment.

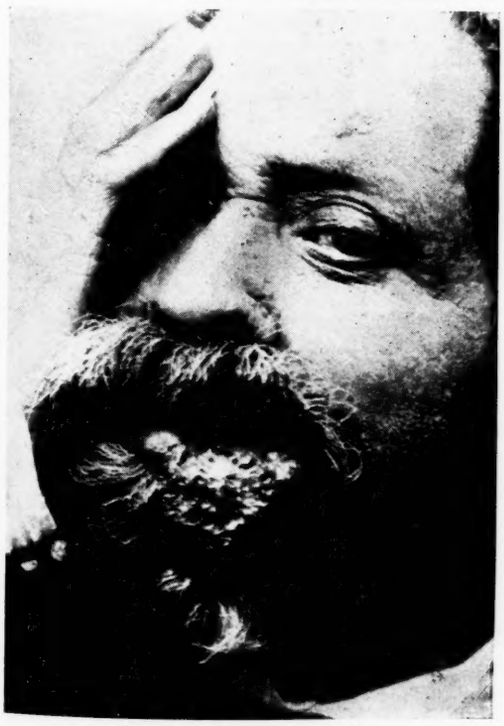


Case I.—After treatment.

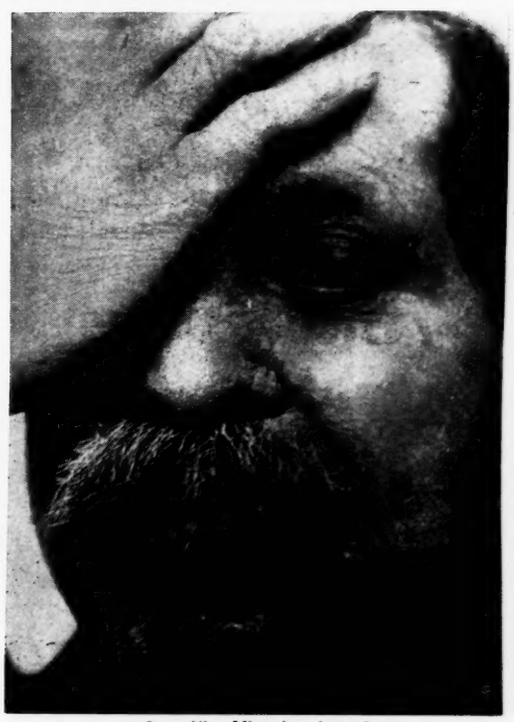


Case II.—Before treatment.

Case II.—After treatment.



Case VI.—Before treatment.



Case VI.—After treatment.

and sections showed in detail the gradual transformation, by cellular evolution, of pure sarcomatous tissue into simple fibrous and cicatricial tissue, the change taking place in three to four months, the clinical and pathological characteristics accompanying each other. The tumour was exposed for sixty-eight hours, in periods of two hours, to the action of 1 cg. of pure sulphate of radium spread on cloth, and placed in a sheath of lead, 1 mm. thick. The treatment lasted, at intervals, from September 15th to November 24th, and again to December 19th, 1908. Full details of the case have been published.[1] In addition to the wall charts illustrating this case were a number of microscopic sections showing the histological changes at various stages of the treatment and the gradual transformation, under low and high power, of pure sarcomatous into fibrous tissue.

CASE IV.

Deep sarcoma of the neck. In July, 1907, two years before treatment was begun, the tumour appeared as a small nodule under the right lower jaw, increasing very rapidly in size in the previous three months. At the time of examination it was purplish in colour, with blood and serum oozing from several orifices. Histological examination showed its structure to be that of a pure embryonic sarcoma. In July, 1909, three tubes, each containing 0.05 cg. of pure sulphate of radium with a silver sheath five-tenths of a millimetre in thickness, were introduced for forty-eight hours. Seven weeks later a deep, indurated, flat mass represented the tumour, which, however, recurred, or rather again showed active growth in November, 1909, when the treatment was repeated with apparently definite success. The patient had now, near the cicatrix, under the skin, a small nodule the size of a split pea. It was impossible to say whether this nodule was of the original sarcomatous tissue, or simply, and more probably, a fibrous remnant. In any case a superficial treatment by radium would be given in order that the patient should have the benefit of the doubt.

CASE V.

Epithelioma of the nose, in which the lower two-thirds of the nose was almost completely destroyed by a fungating growth. Treatment consisted chiefly in three applications of twenty-four hours each with an apparatus containing 0.09 cg. of pure radium in, first, a glass ampoule, and, second, a silver tube, 1 mm. thick, covered by a rubber drainage tube. The result is chiefly interesting in the remarkable restoration of tissue. The radium seems to have had the effect (1) of singling out the malignant tissue and causing its absorption, and (2) of sparing the normal tissue and determining a certain amount of healthy new growth. The photographs showed the left nostril represented merely by a cleft in the epitheliomatous mass (or "rodent ulcer," to use the term commonly given to such cases in England). Along the edge of the right ala nasi was a thin border of more or less normal skin extending forward to the point of the nose, represented by a small area of skin the size of a large pea.

CASE VI.

Epithelioma of the mucous membrane of the lower lip. Growing rapidly in a patch of leucoplasia, and treated for one hundred and forty hours with an apparatus containing 0.01 cg. of pure sulphate of radium, giving a radiation of 4,500 intensity through ½ mm. of lead. Recovery seemed complete in March, 1908, and to-day (July 27th, 1910) the members present are able to satisfy themselves as to the complete integrity of the mucous membrane of the lower lip. (See Special Plate.)

CASE VII.

Epithelioma of the roof of the mouth, starting from the maxillary sinus. In Dr. Tuffier's wards, a case of glandular epithelioma, perforating the palate and alveolar border, for which resection of the upper jaw was considered necessary in September, 1908. A glass tube containing 9 cg. of pure bromide of radium, surrounded by a silver sheath 1 mm. thick, and a rubber drainage tube 2 mm. thick, was inserted into the tumour through the socket of the second molar tooth, which had been extracted. Eleven applications of four to five hours were made, and recovery seemed complete in two months—in December, 1908. The pain and discharge gradually diminished, the cancerous mass and swelling of the adjacent mucous membrane also disappeared, and the teeth became firm in their sockets. This patient was examined by the members present. No trace of the neoplasm could be found, the mucous membrane of the palate round the perforation appearing quite healthy. Sections of the tumour were thrown on the screen, and were also shown under the microscope in the pathological museum.

CASE VIII.

Epithelioma of the breast in a nun, aged 35 years, the growth being of eight months' duration. When first seen the tumour was ulcerated and purple in colour, soft, mobile, and bled readily; there were no glands felt; there was slight retraction of the nipple. In November, 1909, two tubes were introduced to a depth of 5 cm. into the tumour, containing 3 cg. and 5 cg. of pure sulphate of radium, remaining *in situ* forty hours. This was repeated in January, 1910, and the tumour gradually diminished till only a small fibrous nodule was left in February, 1910. The sections showed the gradual transformation of the tumour in various stages of the treatment, and the complete histological detail of the regression of a cancer of the breast.

[1] *La presse médicale*, No. 9, January 30th, 1909.

CASE IX.

Malignant tumour of testicle, originating in seminal tubes, with, later, metastatic growths in the pelvis and abdomen; a case still undergoing treatment, and interesting as showing the effect of radium in arresting metastatic growths. The patient was operated on by castration in June, 1908. In August, 1908, there was a large metastatic tumour in the left iliac fossa, measuring nearly 5 in. in diameter, pressing on the iliac vessels and causing oedema of the whole leg, with great pain. In January, 1909, laparotomy was performed, when the tumour was considered inoperable, and three or four tubes of silver $\frac{1}{10}$ mm. in thickness, and containing each 0.05 cg. of pure sulphate of radium, were introduced into the mass, and left in for forty hours. In a month there was great diminution of the tumour, with disappearance of pain and oedema, and improvement of the general condition. In July, 1909, the patient returned with a second mass, probably in the prevertebral glands, felt chiefly in the left hypochondrium, between the kidney and the spleen. Laparotomy was again performed, and 0.15 cg. of radium in three tubes enclosed in a rubber drainage tube were again introduced for forty hours, and again the condition improved. In April, 1910, the tumour had once more increased, and radium was this time inserted by a fistulous track left by the drain, with considerable improvement. Again, ten days ago (July, 1910), a similar treatment was given with immediate relief of pain, and it might not unreasonably be hoped that it would be followed by similar regression of the mass.

DISCUSSION.

Mr. RICKMAN J. GODLEE, F.R.C.S. (University College Hospital), said that he had already seen some of these cases and had talked with Dr. Dominici. Some confusion arose owing to the terms employed to describe the cases. The term "epithelioma of the breast," as applied to a case just described by Dr. Dominici, was scarcely one which an English surgeon would use. The result was very interesting, of course, if it was a case of adult cancer. He desired to know whether there was any instance on record of scirrhus of the breast—what they knew as real cancer of the breast—being ameliorated by radium. Dr. Dominici had given them an opportunity of seeing drawings of the sections in his cases, and so far as he (Mr. Rickman Godlee) could see, the appearance of the large masses of epithelial cells in Case v more resembled that which was seen in sections of rodent ulcer than in those of epithelioma. If that was the case, one was not altogether surprised to see such results obtained, although, nevertheless, they were rather remarkable. Further, he wished to know whether Dr. Dominici had obtained favourable results with squamous epithelioma. He understood him to say in the course of conversation that in early squamous epithelioma radium and the *x* rays would do harm rather than good. Yet in one of the cases shown he could hardly conceive that the tumour from which the photograph was taken could be anything other than a squamous epithelioma. From the appearance of the photograph in the case of the infant who was said to be afflicted with haemolymphangioma of the neck, he judged the case to be one of cystic hydroma; yet it could not be that, because of the haemorrhages. The vascular part of the tumour was of more importance, he supposed, than the lymphatic part—that was to say, it was more of a vascular naevus than a lymphatic naevus. The French surgeons undoubtedly had considerable success with angiomata, and he wished that here in London they had a similar supply of radium to that which their colleagues across the Channel had at their disposal.

Dr. N. S. FINZI (London) said that he had a certain amount of experience with radium in treating cases similar to those which Dr. Dominici had shown, and with much the same results. It was not every case that was amenable to this treatment. Moreover, the radium-therapeutist generally received the cases after the surgeon had done several operations upon them. On the whole, his experience with squamous epithelioma had been unfortunate, although he had one case, affecting the lip, which got well under treatment. The results in glandular carcinoma were different. There was usually a diminution in size, and in quite a number of cases a total disappearance. He did not like dealing with cases of carcinoma of the breast. They only came to him after a series of operations by the surgeon. And although the visible growth might disappear, the patients generally succumbed to deep metastasis in the liver or the mediastinum.

Dr. HORACE MANDERS said it would be interesting to know whether the radium, acting on the original local malady, had any effect at all upon the metastases. Was there any diminution in them at all, or must they each be treated locally?

Dr. C. R. C. LYSTER (Middlesex Hospital) wished to know what was the actual distance at which they might expect alteration in cell growth from the radium. He noticed that in the larger tumours upon which Dr. Dominici had acted surgical openings had been made and tubes placed in different positions. It would be interesting to know what distance apart these tubes had been placed. He had never seen any results in deep growths until that day, and such results might be accounted for by the insertion of the tubes in the depths of the tissues.

Mr. DEANE BUTCHER (London Skin Hospital) said that after what Sir J. J. Thomson had said in his wonderful address before the Section that morning it seemed as though the therapeutic result might be due not really to the radium emanation, but to the softer x rays or secondary rays which emanated from the tube in which the radium was contained. It would be interesting to carry out a certain number of experiments upon different tubes. In the early days of radium-therapy gold tubes were used, and, later, silver ones. At the present time, Abbé, of New York, was using tubes of celluloid. In each case, according to the theory which Sir J. J. Thomson had propounded, one would expect some difference in the treatment.

Dr. A. A. WARDEN, in reply, said that in the case of epithelioma of the breast, about which Mr. Rickman Godlee had spoken, there were no glands. Such an epithelioma as that had little tendency towards metastatic growths. Mr. Godlee had spoken of haemorrhages from the angioma. There were no haemorrhages. The tumour was closed when it was treated. The diagnosis of haemolymphangioma was made from the section, which showed the voluminous blood vessels and the lymphatic vessels, and in incising the tumour blood and lymph escaped.

A METHOD OF TREATMENT BY RADIANT HEAT AND IODINE IONIZATION.

By C. F. BAILEY, M.D.,

Assistant Physician, and Medical Officer in Charge of Electrical Department, Sussex County Hospital, Brighton.

THE main indication for treatment by radiant heat and iodine ionization is the presence of thickening of ligamentous and fibrous structures surrounding or entering into the composition of joints, adhesions limiting movements of joints, tendons, or muscles, and in fact any deposit of fibrous tissue, newly or comparatively recently formed, which tends to limitation of movement or the production of pain, especially on movement. It therefore finds its use in fibrositis, chronic rheumatic arthritis, rheumatoid arthritis, chronic synovitis, teno-synovitis, sciatica, lumbago, and various myalgias.

Object of the Treatment.

The object of the treatment is to attempt to bring the affected structures into a condition more nearly approaching the normal by increasing their supply of arterial blood to a state of active congestion, by stimulating leucocytosis and metabolism, and at almost the same time driving iodine ions towards the abnormal parts, dissociating iodine and other salts which may be present in them into their component ions, and generally causing such a disturbance of the structure as may promote a change (and a beneficial change) from their abnormal condition by the passage of a galvanic current of considerable volume.

Radiant Heat.

The action of heat generally in relieving pain and checking the progress has always been recognized in these affections, but I think the most efficacious of all heat applications is dry radiant heat. The usual radiant heat appliances are boxlike, the distance of the radiant surface from the joint cannot be regulated, and if they are covered in with asbestos sheeting they become imperfectly ventilated. In consequence, we have with radiant heat a condition to be avoided—namely, "moist air heat," produced by the patient's perspiration. They have a more important defect in that, as the radiant surfaces are made of ordinary low candle power electric carbon filament lamps, they give out rays consisting almost solely of the yellow and yellow-orange. Now the ideal type of radiant heat should be as nearly as possible like sunlight, and should give a spectrum ranging from the ultra-red to the ultra-violet.

This type of spectrum can apparently only be obtained from lamps of a very high candle power. I find the so-called leucodescent radiant heat apparatus, manufactured in America,[1] satisfactory. It consists of one single large lamp in a funnel-shaped projector lined with a reflecting surface. The projector can be raised or lowered by a system of counter-weights or turned in any direction with one hand; the rays can be directed easily and rapidly on any part, and the maximum amount of heat the patient can bear adjusted to a nicety. The lamp possesses a thick filament requiring 12 ampères; it thus uses up as much current as twenty-four 32 candle-power ordinary lamps. Twenty-four 32 candle-power lamps would give 768 candles, the large lamp has a luminosity of 500 candles only; electric energy, therefore, equal to 268 candles is used up in producing heat and other rays of the spectrum. A temperature of 400° F. is obtained, and as it is perfectly dry heat it can be endured with fair comfort and without damage to the skin.

The parts treated, as a rule, undergo twenty minutes' exposure to the radiant heat projector at such a distance (the patient regulating this) that just as much heat is applied as can be tolerated. During the sitting the patient moves the joint into different positions, turns it from side to side, and gently rubs the skin with the hand to allay the scorching sensation, which passes off fairly rapidly, and is followed, as the heat penetrates into the joint, by a sense of comfort and relief from pain. When the lamp is switched off the part feels burning hot to the touch, and the surface is red and mottled from vascular dilatation.

The general result of a radiant heat exposure is that the cutaneous and deeper vessels dilate, lymphatics become filled, local arterial pressure is diminished, and local metabolic processes are increased.

The effects do not pass off at once, and probably after repeated exposures they become more or less permanent.

The duration (twenty minutes) of the exposure to radiant heat is about as much as the skin of the patient will stand if the applications are to take place daily for some weeks.

The results of treatment by "radiant heat alone" in our hospital cases show that, although this is inferior to the "combined" method, yet that "radiant heat alone" does possess a definite value in alleviating pain and in causing improvement in joints and their surroundings as regards improved flexibility and reduction in size.

Iodine Ionization.

As soon as the radiant-heat sitting terminates ionization with iodine "ions" immediately follows. In *no case* is the current allowed to cross from one side of the body to the other, or from one limb to another, because any sudden alteration in the milliampèrage of the current passing produces a much more unpleasant effect if the spinal cord is in the circuit. Furthermore, as "iodine ionization" is much more useful than "lithium ionization" (if one uses a solution of lithium iodide), therefore the joints more especially requiring treatment are the ones connected with the negative pole. Iodine ions seem to be more valuable than the other halogen ions for solvent action on fibrotic deposits. I always now use a 2 per cent. lithium iodide solution, preferring lithium ions as being less corrosive than ions of potassium or sodium. The solution is made with distilled water, and enough linimentum iodi is added before using the fluid to give it a sherry colour and have an excess of iodine present; the specific gravity is 1025. Schall's arm baths are used for both arms and legs; they are filled to a height sufficient to cover either wrists or ankles with solution which has been made *nearly boiling*. Long strips of lint, 6 to 10 in. wide, are soaked in the hot solution, slightly wrung out, and wrapped round the knees in treatment

[1] Obtained for me by Mr. A. E. Dean.

of both ankles, above the elbows if both wrists require it, or they are folded and applied as pads, several square inches in area, if shoulders, hips, or sacro-iliac joints are to receive ionization; the pads or bandaging should in all cases fit close and be quite six-fold thick equally all over. A copper chain-mail electrode is spread over each lint pad, its edges at least one-third of an inch inside the edges of the lint; it is bandaged carefully on, leaving the connexion for the electrode cords exposed. The area of the electrode covering a knee averages 500 sq. cm.; shoulder, 450 sq. cm.; hand when in bath, about 200 sq. cm.; foot, 300 to 350 sq. cm.

Two carbon electrodes are placed in each bath. When two limbs are treated at the same time, the "connexion" of the two baths with the required pole is made by three plugs carrying four cords, the centre plug carrying two, while at the bath's end each cord is attached to each of the four carbon electrodes. By this means equality of voltage is ensured in the two baths, and the possibility of shock from a defect in a single cord is avoided. The other pole is connected in a similar manner by three plugs carrying four cords, one single cord and one of the two double cords is attached to each copper chain mail electrode; this method again to equalize voltage and avoid a shock. By the time the connexions are made the bath solutions have cooled sufficiently for the patient to put his hands or feet, whichever may be required, into the baths. The current is now turned on, raised by 5 milliampères at a time quite gradually, until, in the case where two knees are treated, the milliammeter records 70 milliampères, but if one only is treated 40 milliampères; after twenty minutes the current is slowly turned off. The average current from one knee to foot is 40 milliampères, both knees to feet only 70 milliampères, shoulder to hand 30 milliampères, lower part of arm proper to hand is 25 to 30 milliampères.

The average current density is about 0.15 milliampère per square centimetre in the hand, but the maximum in parts may rise to 1.5 milliampère per square centimetre. In the foot the average is 0.1 milliampère per square centimetre, but the maximum may be 1. Currents of this magnitude only produce reddening of the skin and can be continued daily without causing soreness, especially if a lanolin and white vaseline ointment is rubbed in at night. I have used in some cases stronger currents, but the risk of skin irritation is greater. Similar methods are used for ionization of shoulders, hip, or sacro-iliac joints, the rule being always to "iodine ionize" the joints most requiring treatment, and to *continue* to "iodine ionize" them from day to day, and not to reverse the poles until such marked improvement occurs that other joints become the most clamant for treatment.

The main points are to keep the spinal cord out of the circuit, use every effort to prevent sudden variations in the current, and try—a most difficult matter—to get the current density equal over the parts. I find the discoloration of the iodine-stained pads is a fair index of how the current is behaving, and I always put an extra thickness or so of lint under the centre of the chain-mail electrode, as that is usually the part more deeply decolorized. I always expect the deep layers next the skin not to be decolorized. Tender skin spots in the bath may be guarded with the ointment.

Duration of Treatment.

Each treatment lasts twenty minutes. Daily applications for four weeks is an ordinary time in bad cases. In oints, improvement is usually not apparent until after the seventh or eighth treatment; after that it is progressive. Some cases improve very rapidly indeed.

The solution can be used again and again for the same case; it is best to decant it into Winchester quart bottles and keep its specific gravity, 1025, constant, by the addition of distilled water, as it concentrates from the heating. As it tends to be contaminated by copper, a little lithium carbonate may be added to each bottle to precipitate this metal. After standing, the clear solution is poured off and liniment of iodine added to convert excess of lithium carbonate into iodide (and some iodate). The chain-mail electrodes after a time become coated with copper iodide, and require to be cleaned (Brooks's soap renders the surface of the rings fresh and bright for further use), because the newer and cleaner the copper the more equally is the electric current spread over the surface of the lint pads.

I attach extreme importance to the continuance of iodine preparations by the mouth during the combined treatment; one great value of cataphoresis is the fact that it causes acid or basic radicles, in a so-called "nascent" state, to be formed in the path of the flow of the constant electric current; any iodine compounds lying in or circulating through the joint tissues—should the patient have been taking them for some time and in fair quantities—are broken up by the current and locked up in the joint tissues temporarily, instead of being carried through the blood vessels and excreted. Besides "nascent" iodine ions generally are in all probability much more actively bactericidal and much more energetic than when they combine into soluble non-ionized salts; also the general migration of all kinds of ions, which takes place along the course of the current, may produce an effect of commotion in and stimulation of the tissues which is beneficial.

I also advise such movements and exercises, carried out as soon as possible after the treatment, as will put adhesions on the stretch and eventually rupture them.

Analysis of Twenty-one Cases (others treated since).

Cures	28.6 per cent.	
Relieved	57.2 ,,	(19.06 per cent. very greatly)
No improvement ...	14.2 ,,	

DISCUSSION.

Dr. H. LEWIS JONES (St. Bartholomew's Hospital) said that the particular interest of Dr. Bailey's communication lay in the fact that he had tried successfully to reduce the treatment of rheumatic and joint conditions by ionic medication into something like a system. There was a good deal of casual employment of ionization in rheumatic cases going on among workers in different parts of the country, and they could do it better if they were to exchange ideas a little more freely. Dr. Bailey's tabulated list of cases was very encouraging. The speaker had also spent some time in the attempt to treat rheumatic joints by ionic methods, and, of course, there was no doubt that the treatment was useful. But one could not help wondering at times to what depth the ions were driven. Still, from the clinical results obtained, he was sure that they were able to drive the ions as deep as was necessary. If they considered such a condition as rheumatoid arthritis, with its affection of many joints, and other symptoms grouped around it, the question might arise as to whether they were attacking what was evidently a general disease in a rational way. It could be pointed out in answer that very frequently the chief trouble of the patient was due to the defect of this or that particular joint, and it was fair and justifiable, therefore, to do what one could to relieve the local symptoms, even if one were pessimistic as to the disease which was responsible for the local trouble. A form of joint affection in which he had obtained very successful results from ionization was a crippling, painful swelling of the knee so frequently found in middle-aged women. The other joints in these cases were really not affected, but the swollen and painful knees presented a clinical picture with which they were all familiar. In that condition he had had the most encouraging results from ionic applications. The treatment had been more successful than anything else of which he was cognizant. He had not done much in the use of iodine with lithium, and had preferred to use salicylate of soda, depending upon the salicylic ion as the agent to give relief. During the first two or three applications there was generally nothing particular to be noted with regard to improvement, but by about the sixth application the patient would say with no uncertain voice that she was much better, that she could go upstairs with ease and could do her daily work. Of course, there was no rivalry between the different ions, and perhaps someone using iodine instead of salicylate in these cases would have similar reports to give, but, speaking from what he knew, he could give the definite information, as a slight contribution to the subject, that this particular type of case could be really relieved by ionic medication with the salicylic ion. He used small towels, making fourteen or sixteen layers, holding just about two ounces of a 2 per cent. solution. That was his reservoir for the application.

He used as electrode a very thin, flexible silver plate, holding it himself in position. By taking the precaution of using plenty of layers, he was able to give large currents for a long time without any blistering of the skin. He could go as high as 30 milliampères, possibly with some people to 40 milliampères, for twelve or fifteen minutes, and this was his routine method for treatment.

Dr. N. S. Finzi (London) said that he had been able to prove absolutely that certain ions could penetrate into a joint. A pad soaked with potassium ferrocyanide was placed around the knee-joint of a monkey, and this was attached to the negative pole, a strong current being passed for some time. The monkey was then killed, and the knee-joint was cut out and placed unopened in ferrosulphate solutions. It was left all night, and the next morning the patella tendon, through which the ferrocyanide ions had passed, was almost black—at any rate, a deep blue, and the cartilages of the joint were blue. This proved, in his opinion, that the ions got into the joint. He had tried iodide and ammonium ions, but he thought it was the combination of the iodide and lithium that had the effects which Dr. Bailey had described. When treating a number of cases he gave very much larger doses than the reader of the paper. The average for treating knees was 70 milliampères, borne for three-quarters of an hour, and the maximum current was 100, or even 150. He placed the patients in series, the lithium pad on one patient being connected to the iodine pad on the next, and in this way he treated four or five cases.

Dr. W. Y. Somerville (Glasgow) said that the amount of milliampèrage employed by different workers appeared to vary considerably, the last speaker even going above 100 milliampères. He had tried 35 milliampères for five minutes, and had found this to be as much as the patients could stand. Was it of any advantage to have these high currents? (Dr. Finzi remarked, in answer, that the current was only turned on gradually, and 100 milliampères was not reached for a quarter of an hour or twenty minutes.)

Dr. Primrose Wells (London) had come to the same conclusion as Dr. Bailey, and was quite certain that in these cases of bad joints the great point was the preparation of the joint for treatment by radiant heat or by gentle vibration—some means which would get back the circulation in these sluggish, swollen articulations, and would prepare the tissues for the more beneficial treatment of the ions. He had got the best results from salicylate, but undoubtedly this combined treatment was very useful, and he wished to bear strong testimony to the fact that by a combination of treatments the electro-therapeutist could obtain most successful results in certain rheumatoid and articular troubles.

Professor Stephané Leduc (Nantes) said that in the application of the ions of chlorine and iodine in the treatment of ankylosis, either from rheumatism, or traumatism, or infections, he had not come across one case in which the application failed to benefit. In some cases the results were very surprising and wonderful; in others the success, although definite, was partial. He quoted the case of one lady whose hands were so ankylosed that she could not move a finger. He was not disposed to accept her, but she spoke of it as her last hope. He applied the treatment, and some months afterwards she could play lawn tennis; she was in perfect condition. The iodine ion was more caustic than others, and the chlorine was equally efficacious. In the course of treatment the utmost attention must be paid to the signs displayed by the patient. Sometimes the current ran down a hair or an abrasion with painful results. The patients differed greatly in the intensity they could support. In the case he had quoted the current was raised to 40 milliampères within fifteen minutes from the beginning of the séance; in other cases a much greater current intensity could be borne. The ions followed the direction of the current—the line of flux—and the efficacy of the treatment might be increased by changing the current direction.

Dr. Curtis Webb (London) said that Professor Leduc's experiences agreed with his own—namely, that equally good results could be obtained in cases of rheumatic or rheumatoid joints, or in other localities where fibrotic deposits were to be dissipated, by employing the chlorine instead of the iodine ion, or, in other words, by using solutions of NaCl instead of KI. The excellent results in the treatment of Dupuytren's contraction by the ionization of Cl had led him (Dr. Curtis Webb) to this conclusion, and results had proved its correctness. This was not surprising when the close relationship of Cl and I in Mendeléeff's classification was remembered, and the bactericidal properties of free chlorine must not be overlooked. In the minds of those who had used this treatment there was no question as to its great value in the conditions alluded to by Dr. Bailey; but the speaker often wondered whether the flow of blood and lymph in the cutaneous and subcutaneous tissues did not catch up the ions and carry them away into the general circulation, and whether the good results must not be attributed as much to the effect of the passage of the current *qua* current, which was really an example of the ionization of the salts of the body fluids through which the current passed, as to the ionization of any drugs from without. In support of this view he quoted the classical experiment of Professor Leduc with two potatoes; but he had been extremely interested in the account of the experiment described by Dr. Finzi, and in the light of that experiment he felt more sure than he had done that the ions did really penetrate deeply into the tissues. He recognized the great value of the leucodescent lamp referred to by Dr. Bailey; but having regard to the possibility of an increased blood flow impeding the penetration of the desired ions into the joint, he always used the heat after and not before the ionization.

Dr. Bailey, in reply, agreed with Dr. Lewis Jones that in such joint affections as he had indicated this was practically the only treatment that seemed to do any good. He (Dr. Bailey) was a physician, and he also managed the electro-therapeutic department of his hospital; but, as far as his experience went, the only local thing that did any good was some kind of heat treatment and ionization. The essential point with regard to the milliampèrage was that other factors, in addition to the number of milliampères, had to be considered. The milliampèrage must be multiplied by the time and the area of the electrode before any useful comparisons between the experiences of different workers could be made. He had known some gouty cases that could only take 15 to 20 milliampères through the joint, whereas others could take about 40. He agreed with Dr. Leduc with regard to the extreme pain which was caused by the passage of the current down a hair, or by the minutest abrasion of the skin.

ON THE TREATMENT OF SOME CORNEAL ULCERS BY ZINC IONS.

By H. Lewis Jones, M.A., M.D., F.R.C.P.,
Medical Officer-in-Charge, Electrical Department, St. Bartholomew's Hospital.

The following cases illustrate the value of ionization by zinc for arresting a form of corneal ulceration, which is known as Mooren's ulcer of the cornea, and is very troublesome to deal with by ordinary procedures. Fuchs in his *Textbook of Ophthalmology* states that it was regarded as incurable as long as surgeons were unacquainted with the cauterization of the cornea with the actual cautery, and again he states that just when one supposes the process of ulceration to be nearing recovery, a relapse sets in, and the disease advances with discontinuous attacks and intervening remissions until the ulcer has covered the entire cornea.

Even with the help to be obtained from the galvanocautery the ulcer is very difficult to arrest, and in a case of long duration the damage to the cornea from the cauterizations becomes serious. Under these circumstances the need for an improved method of treatment is manifest, and in September, 1907, Mr. Holmes Spicer sent me a case which was under his care in the ophthalmic wards at St. Bartholomew's Hospital, to see whether anything could be done for it by electricity. The result was satisfactory, and since then three other examples of

Mooren's ulcer have been sent to me by Mr. Jessop or Mr. Spicer from among their out-patients. In all of these the cure has been quick and complete, and I submit the following notes of the four cases:

CASE I.

M., 61. This patient had had ulceration of the right cornea for a long time, in spite of repeated cauterizations, and the cornea showed much scar tissue. On September 19th zinc ions were introduced at a small ulcerated spot near the margin of the cornea, using a current of 1 milliampère for one minute, and on the 26th a second small area staining with fluorescein was discovered near the other spot, and was treated in the same way.

Both spots healed rapidly, and a month later the cornea was reported to be quite sound. The patient has been seen frequently since, but has had no more trouble.

The second case was as follows:

CASE II.

F., 47. Ulceration of the outer and upper margin of the right cornea. It has existed fourteen days. On September 14th, 1908, the ulcerated area was ionized with zinc. It was of considerable size, occupying about one sixth of the cornea. A current of half a milliampère was applied for six minutes, in several fractions, as the patient was much agitated and apprehensive during the application.

Three days later the ulcer was healed, and remained so.

CASE III.

M., 40. An ulcer of the left cornea, with considerable pain and much injection of the conjunctiva. Under cocaine, zinc ions were introduced for three minutes, with a current of 1 milliampère in three periods of one minute each, owing to the timidity of the patient.

Four days later the report from the ophthalmic department stated that there was no longer any staining with fluorescein. The ulcer was healed, and remained so.

CASE IV.

This was the same individual as in Case III. He returned in the following year, 1910, with a similar ulceration in the other or right eye. This was ionized as before for two minutes, but the patient then became unruly, and refused to go on. A fortnight later he came again. The first application had not completely arrested the ulceration, and it was repeated for three minutes with a current of 1.5 milliampères. This was followed by a healing of the ulcer, but a certain degree of conjunctival congestion remained. At my suggestion this was treated with a simple zinc lotion, and under this treatment the eye became normal in a day or two.

The facts just stated are so simple and interesting that they are well worthy of being placed on record, and I consider that the treatment of Mooren's ulcer represents a point gained for ionic medication.

The following theoretical considerations appear to me to be justifiable. The success of the ionic treatment compares in a striking manner with the poor results of treatment by lotions. Where lotions have succeeded they have been of antiseptic nature, such as strong carbolic acid, absolute alcohol, and the like. It seems probable that in Mooren's ulcer we have a bacterial disease; and one observer, Andrade, has actually described a specific organism. A micro-organism, if intracellular, would be out of reach of a simple lotion, and yet might be easily reached if a suitable drug were applied and caused to penetrate by means of the electrical current.

Mooren's ulcer is characterized by a great tendency to relapse, and to involve both eyes either simultaneously or successively. It may be due to an infection which finds access to the conjunctival sac, and may exist there for a time without producing corneal ulceration. Once the surface of the cornea is attacked, the mischief may be kept up by reinfection from the conjunctival sac. We can understand that a zinc lotion is able to destroy any germs which are free, but cannot reach those which have penetrated into the depth of the cornea. It is therefore unable to arrest the ulceration, unless assisted by ionization, but may be valuable for preventing reinfection.

The technique may be briefly described. A loop of zinc wire or the end of a zinc rod is armed with a fine web of absorbent wool, and dipped in a solution of zinc sulphate at 1 per cent. This forms the positive electrode, and is fixed in a suitable handle attached to the source of current. The negative electrode is the usual moistened plate or disc, applied to any convenient skin surface of the patient.

The eye must be carefully cocainized, and the positive electrode then held lightly against the ulcer so as to bathe its whole surface with the zinc solution. An assistant then turns on the current very gradually up to 1 milliampère or 1½, according to the size of the ulcer and the toleration of the patient. It must also be turned off very gradually at the close of the application.

The current is to be applied for three or four minutes in one application, or for a little longer if done in two instalments. The patient needs to be carefully handled and encouraged, because it appears that the procedure is in some way disagreeable or alarming. At any rate, that has been my experience. The patients become agitated, although they admit that the application is not specially painful. Perhaps this apprehensive state is due to the indefinite image of the electrode, as seen out of focus, or it may be an effect of the current. The eye should be treated for a day or two by instillations of zinc sulphate (1 per cent.) after the ionization is over. A single good application should cause healing within a week.

DISCUSSION.

Professor STEPHANÉ LEDUC (Nantes) said that he was delighted to hear of a successful result in such a troublesome eye disease. With regard to the agitation and apprehension of the patient, to which Dr. Lewis Jones had alluded, it was the quality and intensity of the current which caused whatever pain might accompany the treatment. He urged a very gradual raising of the current in all cases in which the ionization method was employed.

Dr. LEWIS JONES, in reply, said that the apprehensiveness of the patients was almost the only difficulty attending the administration of the zinc ion in this way. It was probably due to the dim sight of a great electrode in the middle of the field of vision, or it might be a current effect. At any rate, all his patients had been excessively agitated and nervous during the whole time of the application, and had to be coaxed to bear it a little longer, although the part was deeply cocainized, and there was no sensation of pain. It was, he considered, a curious mental phenomenon.

THE CONDITIONS NECESSARY TO OBTAIN RADICAL CURES BY MEANS OF THE X-RAY TREATMENT.

By LEOPOLD FREUND, M.D.,
Vienna.

[ABSTRACT.]

AFTER a reference to some distinguished British workers who had assisted the progress of radio-therapy, Dr. Freund exhibited a tabulated summary of all the cases he had treated by means of Roentgen rays since 1896. The table showed that in the first group of cases, of which hypertrichosis, alopecia areata, tinea tonsurans, and favus were representative, treatment had been given only once and was followed by radical cure; in the second group, represented by lupus vulgaris, Paget's disease, rodent ulcer, epithelioma, superficial tuberculous osteo-arthritis, and others, radical cure was obtained after treatment had been given in the shape of two or more series of irradiations; in the third group, comprising prurigo, eczema, psoriasis, lichen ruber, hyperidrosis, lupus erythematosus, etc., transient improvement was obtained after treatment had been given several times; and in the fourth group, consisting of deep-seated carcinoma and sarcoma, keloid, prostatic enlargement, leukaemia, exophthalmic goitre, and other difficult conditions, success was uncertain after treatment had been given several times. The most favourable conditions for treatment by means of the Roentgen rays were, therefore, diseases of the hair, or, rather, diseases of the hairy parts of the body. Dr. Freund said:

"It is not easy to perceive why that is the case. It is a well-known fact that those trichophyton parasites, which are removed from the heads of persons suffering from favus or tinea tonsurans simultaneously with the hairs, still show energetic vitality and can easily be cultivated, whereas the dose of x rays which caused them to fall out suffices for the complete cure of the skin disease caused

by the parasite, despite the fact that in the changes of the hair follicles many parasitic elements remain behind. The explanation of this very singular fact is furnished by the conduct of other affections caused by micro-organisms when the former are exposed to the Roentgen rays. When, for example, we expose a furunculosis to small repeated doses the formation of pustules does not cease at once; on the contrary, it seems as if they were strengthened and stimulated at first by the first application of the rays. But after a definite and sufficient dose of the rays the formation of pustules ceases quickly, no new pustules appear, and the old ones crumble. Evidently after a definite dose of the rays there is formed in the tissues a certain substance, a poison detrimental to the future development of the bacteria."

Dr. Freund then went on to examine the causes of the comparative failure with the affections of his third group, premising that the tissues in these affections—eczema, psoriasis, etc.—were not less sensitive to the Roentgen rays than those of the second group—lupus vulgaris, epithelioma, etc.: "I exposed a young man for psoriasis, applying rather more than a normal dose (nine sittings) to an exceedingly hard spot on his left elbow by means of a moderately soft tube (seven Wehnelt unities). The consequence was a painful erythem that began on the ninth day. There was a dark red surface contrasting with some spots having psoriasis scales clinging to them, from which the patient had been quite free before treatment. After a week these white spots turned red, although not so intensely red as the surrounding parts. Accordingly the psoriasis scales on the skin during the new exposure resulted in a considerable weakening of the biological effect of the Roentgen rays, for underneath them the skin was strikingly less irritated than in the scabless parts adjoining. But wherever, before exposure, the patient had thoroughly removed the skin scales by washing and maceration no relapse took place."

Dr. Freund then related certain experiments which he had carried out with the object of showing the absorbent action of psoriasis scales. "These experiments," he said, "illustrate the necessity in Roentgen therapy of removing out of the way of the rays anything that can even slightly reduce their effect. This is a matter to which most specialists pay too little attention. All of you have found out by experience that ulcerated tumours are more easily affected by Roentgen rays than are ex-ulcerated ones. Since a psoriasis scab or a thin covering of epithelium so greatly reduces a result otherwise good, how much more must thick layers of normal or pathological tissue, through which the rays have to force their way before they reach the basis or focus impede the attainment of that end! Consequently every treatment with Roentgen rays should be preceded by preparatory treatment. By means of such preparatory treatment all those filters which decrease the histological effect of the rays, such as crusts, scales, infiltrates, newly formed tissues, must be thoroughly removed, chemically and mechanically, and not until then should the basis thus laid bare be exposed to the action of the rays. I believe that in severe affections better results than those hitherto achieved could be attained by previous curettage and cauterizing, and by not exposing until after the scurf has separated. Only in this way can we succeed in thoroughly curing tuberculous and epithelial processes in a short time.

"Histological investigations show that, for example, in cases of psoriasis seemingly cured by Roentgen-therapy, under the perfectly normal surface of the skin there were deposits of diseased tissue, and from these proceeded the constant recurrence of the disease. The physician's task is to destroy these, and he often succeeds by means of periodical after-treatment, which must be resumed every five or six weeks. By means of this periodical subsequent treatment we must as far as possible endeavour to master the affections of my fourth group—deep-seated carcinoma, and sarcoma, keloid, etc.—the situation of which renders them not very favourable for treatment by means of the Roentgen rays."

DISCUSSION.

Mr. Deane Butcher (London Skin Hospital) said that the question of Roentgen vaccination, to which he drew attention some weeks ago,[1] received a good deal of support from Dr. Freund, although he did not call it by that name. In the early part of his paper he referred to an action of the rays which was of the nature of Roentgen vaccination. This was a matter about which they would hear more during the next few years or months. Another interesting point in the paper was the emphasis laid upon the necessity of clearing away every bit of scab that would shield the lesion from *x*-ray action.

Dr. H. D. McCulloch (London) said that the problem of immunity, touched upon by Mr. Deane Butcher, was a fascinating one where Roentgen-therapy was concerned, and it was encouraging to find that Dr. Freund's researches endorsed this *x*-ray effect in the maladies in which he had had satisfactory results. The speaker would emphasize the fact, however, that "vaccines" in the Jennerian sense could only result after the introduction into the living tissues of the body of the causative factor or pathogenic micro-organism when a well-balanced reaction was produced. The *x* rays themselves aided this physiological process when it was defectively responded to, but did not themselves cause a vaccination or an independent immunity in any physiological sense. He had on a previous occasion published his views on "auto-vaccination" by these methods, controlled by opsonic estimations.[2]

Dr. Primrose Wells bore testimony to the importance of thorough cleaning of the surface of all parts exposed to the *x* rays. He had succeeded in curing ancient patches of psoriasis and eczema by comparatively few exposures of the rays, the cure being due, he considered, to the fact that he generally gave a light bath first, which very effectually removed all scales, etc., from the surface. Some of the success was due to an arc light used in the bath, but, undoubtedly, some of it was due also to a clean surface.

Dr. Freund, in reply, said that the matter of measurement indicated in his paper was, he believed, of some importance, because measurement of the intensity was commonly made by means of changes which took place in chemical preparations, and the effects upon chemical preparations were not parallel with those upon the living tissue. With regard to other treatments, they had in Austria some baths of great radio-activity, and on making experiments he found psoriasis patches yield very readily to a combined treatment of radio-active substances and the *x* rays.

HYPERIDROSIS CURED BY X RAYS.

By A. Howard Pirie, M.D., B.Sc.,
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The cure of hyperidrosis by means of *x* rays is a branch of radiology which is very useful and very neglected, yet the treatment required is short and the result is most satisfactory. It is usually excessive perspiration in the armpit which calls for treatment, and the degree of perspiration is such that every day the patient has all his clothes in the region of the armpit absolutely soaked through by perspiration. The result of proper *x*-ray treatment in such a case is that the armpit becomes even drier than in the case of a normal person. *X* rays have a selective action on sweat glands which are excessively active because in these glands there is a constant formation of young cells which are easily destroyed by *x* rays while the older cells of the skin adjoining are left intact. It is possible that the action of the rays is on the nerve-endings, but I am inclined to believe that the former is the true explanation. There is a peculiar form of hyperidrosis which I have met with in three cases of which the symptoms are identical.

In these cases the perspiration has begun each day after breakfast, gone on all day, till by evening the clothes in the region of the armpit have been soaked through and wringing wet. In each case the patient had to change his clothes for the evening, and from that time on till next morning after breakfast he had no more excessive perspiration. And so it went on every day as long as the patients could remember. In these cases, also, heat did

[1] *Archives of the Roentgen Ray*, June, 1910.
[2] Ibid., April, 1907.

not materially increase the perspiration, but cold increased it very much. Worry and excitement also increased it.

This type is so different from ordinary hyperidrosis that it may be called hyperidrosis frigida—that is, hyperidrosis increased by cold. In every case, whether of the ordinary type, which is increased by heat, or of the hyperidrosis frigida, which is increased by cold, the result of *x*-ray treatment has been the same—namely, the patient has been made absolutely comfortable, and the axilla has been made either absolutely dry all the time or the perspiration has been reduced to less than that in a normal individual.

My attention was first drawn to the subject in 1906, when I unintentionally destroyed the sweat glands in a patient, who afterwards pointed out to me that he did not perspire in the part treated by *x* rays, while he perspired at his work in other parts of the body. Later on I noticed in the BRITISH MEDICAL JOURNAL that a doctor had had the skin of his axilla excised in order to get rid of the excessive perspiration there. I pointed out in the BRITISH MEDICAL JOURNAL[1] how unnecessary this operation was, when *x* rays could accomplish the result with far less inconvenience to the patient; and since then I have treated the following cases, with results which have been most gratifying to myself and eminently so to the patients, four of whom are medical men.

CASE I.

A joiner, who pointed out to me that after a number of sittings in October and November of 1906, when he received unmeasured doses of *x* rays, he found that the part so treated did not perspire when the rest of the body did. I examined him three and a half years after the last *x*-ray treatment, and found that the part was warm and dry, while the surrounding skin felt warm and moist. Thus the sweat glands had ceased acting for three and a half years.

CASE II.

A medical man, who had suffered from excessive perspiration in the armpits as long as he could remember, could recall especially the white line left on his Eton jacket at school by the evaporation of the perspiration. He called it his "high-water level." The character of his hyperidrosis was as follows: It began every day after breakfast and went on all day till evening. It soaked through to his jacket and made it thoroughly wet, so that he had to change at least once a day. If he remained at home during the evening he did not perspire excessively, but if he went out for the evening it was very troublesome. Cold weather made it worse, as also did excitement and extreme heat. Treatment was begun on May 17th, 1909, when a pastille dose to each armpit was given. Part of the right axilla received two pastille doses, and it is interesting to note that nothing more than a slight redness followed this dose. Three weeks after this first treatment the patient noticed a decided improvement. On July 2nd a similar treatment was given, and at that time I noticed that the openings of the sweat ducts protruded as little white heads. At the same time he found that his shirt got wet in the forenoon but dried again during the afternoon.

Later on a third treatment was given, and on September 17th a fourth, which was the last. After this last treatment no more *x* rays were given, and the patient has been quite comfortable ever since. Eleven months after the last treatment he wrote to me, saying: "I have not experienced the slightest indication of any return of what was a very real and tiresome infirmity. At our first meeting you propounded the problem, 'What will become of the sweat if it is stopped from exuding in the axilla?' Well, I find that if I am extra nervous or worried my hands become slightly moist—that is all, and that is very slight. I have not so far developed gout or any uric acid trouble. This, I venture to think, is worth recording—namely, that stopping the action of over-active glands in one part does not cause trouble in any other part or organ. It is an unqualified and, I believe, permanent cure."

CASE III.

A medical man whose hands perspired so freely that he dreaded to perform an operation or attend a confinement. Excitement and heat made the perspiration more profuse; cold lessened it; he had suffered from it as long as he could remember. When I first saw him I dried his hands and watched the beads of perspiration collect within a minute. He had tried to control it by soaking his hands in 1 per cent. formalin, and this did control it slightly for a short time, but by frequent applications of formalin his hands grew very rough and cracked. As soon as the effect of the formalin passed off the perspiration came back.

The first treatment of one pastille dose to the hands was given at the end of May, 1909, followed by similar treatments on June 30th, July 28th, and August 29th. On the last date he found his hands hardly perspired at all, and I noted that they were drier than my own. *He* was satisfied with his condition, though *I* would not call it perfect; but he had to come more than a hundred miles for the treatment, and he did not come again till March 18th, 1910, when he happened to be in London. On July 8th I saw him again, and the perspiration had completely ceased, except between the fingers and over the hypothenar eminences, where it was very slight. These parts had received a smaller quantity than the rest of the hands, and had, therefore, partly escaped the effect of the rays. . . . He requires to use nothing for his hands now, and they are quite comfortable. On July 26th, 1910, he wrote to me saying: "Before coming to you I had tried all the usual remedies, such as sulphur in milk and belladonna internally; carbolic acid, formalin, salicylic acid, liniment belladonna, etc., externally. These could only keep it in check, whereas since you treated me I have been able to discard the lot." He goes on to say: "I look on the *x* rays as the only cure, and there seems no reason to doubt that the cure is permanent."

CASE IV.

A medical man, who suffered from excessive perspiration over his face, axillae, and hands. It was made worse by heat and excitement and improved by cold. When he lay down on my couch for his first few treatments his face perspired as if he was in a Turkish bath, and the perspiration ran from his axillae and soaked a part of the couch. The several parts were treated in a similar way to the other cases. The treatment was spread out from July 16th, 1909, till March 25th, 1910. There was an interval of a month as a rule between the treatments of any one part.

The face was the most troublesome part to treat, as it had to be done with extreme caution. The final result was reported to me by the patient on May 24th as follows:

"1. I commence with the axillary glands. The treatment has been perfectly successful. There appears to be entire cessation of activity under all circumstances and conditions.

"2. The hands are hardly less satisfactory. There is slight secretion, however, but it cannot be called troublesome.

"3. As regards the face the sweat glands have been profoundly altered, but have not been so profoundly annihilated as in the case of the axillae. The secretion, however, is so slight as to cause me none of the old discomfort of body and mind."

The treatment of his face, though so far satisfactory, caused me so much anxiety that I hope I shall not have to treat another face for excessive perspiration. With the armpits I feel no anxiety and feel certain as to the result.

CASE V.

A medical man, who suffered from excessive perspiration in the axillae, and had done so for many years. It began after breakfast and went on all day, but stopped in the evening. He had none at all at night. It was made worse by cold and worry. Formalin 40 per cent. and other strengths, dusting powders, and atropine ointment had no effect on it. He tried to control it by means of a sheet of india-rubber, but this only made the part like a poultice.

A first treatment was given of one Sabouraud's dose to each axilla, and a month after he thought there was some improvement. Slight epilation followed this treatment, but I noticed that the perspiration was still profuse. A second application of similar quantity was made a month after the first, and a month later both axillae showed a brown reaction. A third application was made two months after the first, and a month later—that is, three months from the first application—the patient returned delighted to report that the excessive perspiration had entirely ceased. On examining his shirt I found it dry and unstained by perspiration. A final dose of two pastille doses was given, and this caused him no inconvenience. Two months later—that is, five months from the first treatment—I found the right axilla nearly completely epilated, and, though it was a hot day and I found my own armpits slightly moist, the patient's skin in his right axilla was perfectly dry, except a small area the size of a shilling in the deepest part of the axilla, where there was a part of the skin which was not perfectly dry, though no perspiration could be seen there. The left armpit was epilated in the upper half and not in the lower half, and there was a slight dampness in the lower half, but not sufficient to stain or wet his shirt—in fact, on comparing my own axilla, I found it damper than his. The axillae have now been dry for three months, and the patient is perfectly comfortable. He has noticed no ill effects from the want of this excessive perspiration, and is very pleased with the comfort of dry axillae.

CASE VI.

A gentleman who had suffered from excessive perspiration for nearly thirty years. This case is one of typical hyperidrosis frigida. It began each day to be troublesome after breakfast, and continued all day till he changed his clothes in the evening, after which it ceased, and he was not troubled by it again till next morning after breakfast. Every day it soaked his jacket in the region of the armpit, and so discoloured his coat that he had to get new clothes more frequently than he otherwise would have required. If he got up extra early and worked in his garden he perspired profusely. Driving on a cold day aggravated it, and so also did any excitement or worry. Heat did not increase the perspiration so much as cold did. When he first came for treatment I could watch the beads of perspiration gather in his axillae within a few minutes.

The treatment was begun on May 25th, 1909, and five treatments in all were given at intervals of about a month. The armpits were divided into areas, so that each part of the armpit received a pastille dose. On September 21st—that is, four months after the first treatment—he reported to me as follows:

[1] BRITISH MEDICAL JOURNAL, April 17th, 1909, p. 953.

"The comfort I am feeling from the treatment is more than I can describe, after having suffered for about thirty years." Nine months later he wrote to me: "I am glad to be able to say that my arms are still quite comfortable. Even yet I have not got used to the indescribable feeling of comfort." It is now eleven months since his condition was cured, and he remains cured.

Conclusions.

There is a pathological form of hyperidrosis which one might call hyperidrosis frigida, which is characterized as follows:

1. It begins to be noticed after breakfast. It goes on all day till evening. It stops during the evening unless aggravated by excitement, cold, or worry. It ceases entirely at night. Its chief characteristic is that it is increased by cold, whereas ordinary perspiration is diminished by cold. Excitement and worry also increase it.
2. This form of hyperidrosis, as well as simple hyperidrosis, can be entirely stopped by *x* rays in suitable quantities.
3. No ill effects follow the cessation of the hyperidrosis.
4. The axilla will stand, as a rule, two pastille doses with impunity.
5. It is necessary to take special precautions so as to ensure that every spot of the part treated receives a total of at least four pastille doses in four months.

DISCUSSION.

Dr. H. LEWIS JONES (St. Bartholomew's Hospital) said that Dr. Pirie had not told them whether in each case there was a permanent epilation or not. Did complete shedding of the hair in the axilla follow the treatment? And was any effect noticeable upon the other glands of the axilla? Did he consider it necessary that the hairs should fall out in order to obtain a result in the shape of a cure of the hyperidrosis, or could the two things be dissociated? Was the excessive sweating dependent upon the hair in the axilla or not? Some people naturally had no hair in the axilla, so that they might assume the hair had no very important physiological value for its possessor.

Dr. G. B. BATTEN (London), in endorsing Dr. Pirie's statements, said that a few years ago he had experience of the exact opposite of this effect. The case was that of a lady who was troubled with constant boils on her face, where, also, the function of perspiration was absent. Sir Malcolm Morris advised the use of the *x* rays, which cured the boils and brought back to the face a normal secretion of perspiration.

Mr. J. HALL-EDWARDS (Birmingham) asked whether Dr. Pirie had any experience of this method as applied to the perineum, and whether he would consider the application safe in that region.

Dr. VERLEY (London) said that he was one of the patients whom Dr. Pirie had treated, and the treatment had afforded great relief to his condition. He had been in the tropics a great deal and also in the cold regions, and the two extremes of temperature accentuated the trouble. In the very clear, dry, crisp, frosty weather, however, it was not so uncomfortable, this being due probably to the fact that the sweat evaporated so easily. He suffered from it about fifteen years ago, and of late years it had become much worse, so that he had almost determined to have the skin excised when he saw an article of Dr. Pirie's on this subject and submitted himself to treatment. The difficulty of the treatment was in keeping still for the length of time required, but there was no pain attached to it, either at the time or afterwards. After the first treatment there was a certain amount of relief; after the second and third treatments there was little effect, but after the fourth there was practically complete success.

Dr. JAMES METCALFE (Bradford) said that Dr. Pirie had stated that there was alteration of clinical signs in the people treated. Were any observations made upon the urine, and, if so, was there any alteration in the composition of the urine in these cases?

Dr. H. D. MCCULLOCH (London) said that, in his opinion, Dr. Pirie had not done himself justice in merely claiming a "cure" in these cases of hyperidrosis. "Cure," like "disease," was after all merely a relative term. He had not only cured, he had permanently restored normal physiological function, which was vastly more important from a scientific point of view. He had thus influenced the trophic nerve mechanisms controlling these glandular functions, and this action of the *x* rays and radio-active substances was one that should be emphasized. One speaker had referred to the restoration of the opposite state—namely, lack of secretion. He (Dr. McCulloch) had during the present year restored hair to the scalp in a case of universal alopecia in a young woman with atrophy of the cutis. Where hair follicles and bulbs had quite disappeared for seven years past—including the hair on the eyebrows and lashes—she now had hair five inches long over the entire scalp, the result of repeated small doses over a long period.

Dr. PIRIE, in reply to Dr. Lewis Jones, said that complete epilation was not necessary in order to get perfect comfort and cessation of sweat. The epilation was partial usually, but it had to be fairly complete. With regard to the sebaceous glands, the little pouting ducts to which he referred in his second case might have had something to do with them. He fully expected that small doses of rays would increase the perspiration of the face. He believed that the perineum would do very well under the same treatment, but it would be difficult to treat, owing to the irregularity of its surface. It would be necessary to divide it up into small areas, as in the case of the face, and treat it carefully. The amount of urine had not been investigated, but it was quite natural to think that it would be increased.

SOME EXPERIMENTS ON THE EFFECTS OF X RAYS IN THERAPEUTIC DOSES ON THE GROWING BRAINS OF RABBITS.

BY

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[ABSTRACT.]

THE authors said the subject was of the utmost importance, as a full dose, indicated by bringing to standard tint the pastille of Sabouraud and Noiré, was frequently administered to children for epilation in ringworm; indeed the Education Committee of the London County Council determined in March, 1909, to make this treatment obligatory, and this led Dr. Dawson Turner to write a letter published in the *Times* of March 30th, 1909, containing a protest.

Recamier's results[1] showed that six exposures, each of ten minutes' duration, with the tube at 10 cm. distance, and with an intensity very little above a medium therapeutic dose, were able in the case of kittens to produce in one month after the last exposure very considerable modifications in the direction of the inhibition of growth of the hemicranium, the bones generally and the teeth, and that the effect continued after the cause had ceased to operate.

Others, in particular Danyz, Scholtz, Obersteiner,[2] had shown that young animals whose brains or spinal cords had been exposed to radium rays died with marked nervous symptoms, and that *post-mortem* examinations revealed hyperaemia with punctiform haemorrhages in the brain and cord.

The question arose whether any change, capable of being demonstrated, in the nervous system would be produced by a dose of the *x* rays, or by a repetition of such doses as are usually employed in the treatment of ringworm.

It was important to remember that in practice more than one dose was usually administered, because as the surface of the cranium was spherical, groups of nerve cells must be exposed to rays which were being applied to opposite areas of the scalp. Where the whole area of the calvaria had to be treated, no matter how careful the

operator might be in giving the scalp an even predetermined dose, the brain was receiving portions of all the doses.

The experiments were performed on rabbits in the laboratory of the Royal Colleges of Edinburgh, with the aid of a Carnegie grant. A litter of six rabbits 6 weeks old was procured, of which two rabbits were to be kept in reserve. The first rabbit was to have one exposure, the second two, the third three, and the fourth four, with weekly intervals between the exposures. Each animal was to be killed three weeks after its last exposure for examination of its brain cells.

It was thought more satisfactory to expose one half of each animal's head to the rays, and to compare that with the unexposed half, than to expose the whole head and to compare that with the head of a control animal. For this reason a leaden mantle was made $\frac{1}{16}$ in. thick to protect completely the animal, except the right half of the head. Cotton-wool was used to immobilize the animal inside the mantle, and to prevent injury through struggling. By allowing the rabbit to take a comfortable position and then covering him with the wool and fitting the leaden mantle a very accurate exposure of any duration could be given. The *x*-ray apparatus included a 10 in. Apps coil, and the tube chosen was of medium hardness, and of very steady resistance; it passed, under the conditions of the experiments, a current of between 0.4 and 0.5 milliampère. At the distance at which the heads of the animals were always placed an exposure of about twenty-five minutes was required to administer a Sabouraud dose.

Owing to the death of two of the rabbits from accidents, only four were left for the experiments. Of the remaining animals:

F died five days after the first exposure, having lost 1 oz. (16 to 15) in weight.

D had three exposures; he fell in successive weeks from 15½ oz. to 13⅝ oz. Nine days after the last exposure he died.

E had two exposures; he fell in weight from 13½ oz. to 11 oz. in two weeks, when he died.

A had three exposures; he weighed at first 17 oz., then in successive weeks he weighed 17½, 16½ (exposures stopped), 18, 19½, 20½, when he was killed.

All the rabbits having unfortunately died except the rabbit A, this one only was left for examination. He should have been killed twenty-one days after the last exposure, but it was noticed that the left iris which had been brown was becoming grey, and as this suggested an analogous fatty degeneration to the arcus senilis of the human eye, it was decided to await further developments. Though the right side of the brain was exposed, the left eye was the first to show changes. An *x* ray epilation and dermatitis of the right side of the snout had been gradually taking place. On the forty-fourth day after the first exposure the left iris was completely grey. Five days later a grey patch 1 mm. broad was seen in the right iris, and in five days this had increased to 4 mm. At this time Dr. A. Sinclair, Assistant Ophthalmic Surgeon to the Royal Infirmary, Edinburgh, made an ophthalmoscopic examination, but no changes other than the fatty degeneration of the irides were observed. At this day, the fifty-fourth, the animal was killed and the brain carefully dissected out. The left or unexposed half was decidedly larger than the right or exposed half. The brain was fixed with formaldehyde and mounted in paraffin, and twenty-six sections (coronal) of the ascending parietal and the ascending frontal convolutions were cut. Each section was mounted complete in order to compare as far as possible corresponding parts of the brain. Twenty sections were stained with haematoxylin and van Giesen's stain, the remaining six with thionin. (Professor R. F. C. Leith, who kindly examined some of the sections, suggested that in future experiments some of the more special stains should be employed.)

On microscopic examination of the two sides it was noticed that in some of the sections

(1) That the large pyramidal cells on the exposed side were not so well developed as on the unexposed; (2) they were more vacuolated, and had not stained so well; (3) they were not quite so numerous.

Objection, it was pointed out, might be made that it was impossible to be sure of comparing corresponding areas, that the difference in staining might be due to the differing penetration of the fixing reagent, and that irregularity in the thickness of the section might account for change number three. Professor Leith, of the Birmingham University, expressed the opinion that the blood vessels on the exposed side were slightly smaller than on the other side, though they showed no other change, such as proliferation of the endothelial lining. There were no changes in the other brain cells, the axis cylinders, or dendrites.

Conclusions.

Owing to the deaths of all the animals experimented on save one, no corroboration could be obtained of the slight microscopic changes observed in Rabbit A. This rabbit should also have been killed on the twenty-first day after the last exposure, instead of which he was not killed until the fortieth day. No conclusion could therefore be drawn as regards microscopic changes (special nerve stains should be employed in future). There were some undeniable gross changes; for example, the difference in size of the two halves of the brain, the fatty degeneration of the irides, both in Rabbit A, and the loss in weight of all the animals during the exposures and the recovery in weight of Animal A after the exposures were stopped. It would therefore seem highly desirable that further investigation of this subject be made.

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DISCUSSION.

Dr. LEOPOLD FREUND (Vienna) said that the experiments were very interesting on physiological grounds, but were made upon rabbits or upon very small animals, and for that reason their value with regard to the human subject was vitiated. Although he had been working with *x* rays for fifteen or sixteen years, he (Dr. Freund) had never seen one injurious effect of *x*-ray treatment so far as the brain was concerned. The question was an important one, not only with regard to treatment in the region of the skull but also in the joints. He had often treated osteo-arthritis with the *x* rays with very good results, and he had never seen any ill effects upon the bones.

Mr. THURSTAN HOLLAND (Liverpool) agreed with Dr. Freund. These experiments upon small animals were interesting purely as experiments, but they had no bearing upon ringworm treatment and its possible consequences in the human subject. In Liverpool during the last few years he had had large numbers of cases of ringworm under his care. They were treated sometimes with measured doses, and at other times without measured doses, and there had never been an accident of any kind, although certainly by now sufficient time had elapsed for accidents to be known if they had occurred. He preferred, however, not to treat very young children in this way, and, indeed, they were easier to cure by other means. But in the case of children the bones of whose skulls were fairly well formed, his feeling was that there was not the slightest risk of injury to the brain or bone. He suggested that a better plan than the one followed by the authors of the paper would be to try some experiments upon adult animals with very massive doses, and then to examine the brains microscopically to see whether they were affected.

Dr. H. D. MCCULLOCH (London) said that the action of these molecular agents upon nerve tissue and brain matter was most important, not so much in view of the supposed danger when these rays passed through the skulls of infected children (now generally accepted to be without danger or risk), but on account of the functional controlling power of the nervous system over all the bodily functions. M. Sicard, of Paris, was, he believed, the first to undertake research in this direction upon the brains of monkeys, but he did not seem to have succeeded in obtaining the pathological changes one would expect. He (Dr. McCulloch) undertook in 1907 to inquire into the effects of the *x* rays upon the brains of mice, and obtained many kinds of neurological changes resulting in paralysis of groups of muscles and sensory paresis changes which they did not long survive. But histological examination of the tissues was difficult to obtain. The distance of the source of *x*-ray energy or radium from the site of the application was a factor to be considered.

Dr. E. S. WORRALL (University College Hospital) said that he also had never seen any ill effect follow *x*-ray application in cases of ringworm. He had always avoided treating very young children, and he did not think it advisable to play over an area that was not protected by bone. The youngest he had treated was 4 or 5 years of age.

Dr. A. HOWARD PIRIE (St. Bartholomew's) said that he had conducted an experiment which went to show that the surface of the brain received only one-fortieth part of the dose received by the surface of the scalp under treatment for ringworm. He cut out a square inch of scalp and skull from a cadaver, and placed it against the glass of the *x*-ray tube. This piece of scalp and bone measured exactly two centimetres in thickness, and a Sabouraud's pastille was placed behind it—that is, two centimetres from the glass of the tube. The pastille was kept dry by means of a layer of gutta-percha tissue. It was thus placed at the correct distance for Sabouraud's method, and was exposed to the *x* rays from the tube while five pastille doses were given from the tube to a child for ringworm. Thus if the rays falling on the pastille had not been filtered the pastille ought to have turned a very deep brown, whereas it only turned to a tint half-way between the A and B tints. That was to say, ten times the normal Sabouraud exposure would have turned the pastille to the B tint. Calculating the power of the rays according to the square of the distance, the surface of the skin of a child's scalp, if protected by two centimetres of extra scalp and bone, would require forty times the normal Sabouraud's dose to cause epilation. It must be remembered, also, that the surface of the brain was still further off than the surface of the skin, and this still further reduced the quantity of the *x*-rays received by the brain.

(In reply to Dr. Lewis Jones, Dr. Pirie said that the skull was that of an adult, but he did not think the difference in thickness from that of a child's was very great.)

Dr. W. IRONSIDE BRUCE (Charing Cross Hospital) pointed out that the assumption that only one-fortieth part of the dose was given through the skull depended upon the further assumption that the Sabouraud pastille was actually turned by the *x* ray. It might be that other radiation from the tube turned the pastille one-fortieth, while all the time one might be giving the brain a very efficient *x*-ray dose. They knew, at all events, that the *x* rays did penetrate the skull in considerable volume and radiograms were easily obtained through the skull.

A MEMBER said that there might be in certain cases a definite increase in the number of exposed cells in the central nerve after a small dose of the *x* rays, and, in that case the nervous system might actually be benefited rather than injured.

The PRESIDENT said that the fact that the *x* rays went through the skull was one that admitted of no doubt whatsoever. But whether the quantity that passed through the brain when a patient was treated was injurious or not raised a difficult and rather alarming question, in view of the number of children who were treated in this way for ringworm. Not one of the speakers, however, had been able to furnish any definite example of injury. There was another reassuring bit of evidence. The early workers with the *x* rays must have had their brains very severely irradiated for days and weeks, but, so far as he knew, there had been no genuine instances of nervous disease follow this continuous exposure. Therefore he hoped that the treatment of ringworm might go on successfully without any untoward happening.

THE RELIEF OF PAIN AND DISCOMFORT BY MEANS OF HIGH-FREQUENCY CURRENTS.

By W. F. SOMERVILLE, M.A., B.Sc., M.D., F.R.F.P.S.,
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AT the present day the subjects discussed at our Sectional Meetings are usually either of a purely scientific nature or are connected with methods of diagnosis through the instrumentality of the *x* rays. The members of this Section, however, are not merely scientists pure and simple, they are men possessed of medical degrees, whose training had in view the relief of suffering among mankind. I feel, therefore, that occasionally reference should be made to the means at our disposal for assisting the essential work of the practitioner, namely, the relief of pain and discomfort in our patients. The older methods of electrical treatment, such as the continuous and interrupted currents, high-frequency and static electricity, should not therefore be allowed to lose their place in our discussions.

Let me for a few minutes give you some of my experiences in connexion with high-frequency currents, a method of treatment I have abundantly practised for over eight years (I refrain from quoting notes of cases, as they would prove wearisome). This important means of treating patients has suffered, like many others, from being at first unwisely boomed, taken up and employed by unqualified persons, and then allowed to a great extent to drop into disuse. But after eight years of careful study of the influence of high-frequency currents, in a great variety of cases and in a great number of men and women of all ages, I am more than ever convinced that in them we have at our disposal a valuable means of alleviating many troublesome affections, some of which cannot be relieved in any other way. Let me refer briefly to some of these conditions.

There is first of all the large class of people who suffer from neuritis or various neuralgic pains more or less severe in different parts of the body. With the exception of opium and its various preparations, relief cannot be obtained by drugs, whereas high-frequency currents carefully applied may secure comfort, if not cure. It has fallen to my lot to cure many cases of neuritis affecting the sciatic nerve where pain was due to neuralgia of the nerve itself and where there were no complications, such as adhesions of the sheath or rheumatoid arthritis of the hip-joint. Neuralgias of the intercostal nerves, the great occipital, trifacial, and even of the lingual nerves, I have frequently seen mitigated in their severity, if not cured, by the application of high-frequency currents given generally and locally. Perhaps the most frequent seat of neuralgia is in the arm on the outer side, the pain running down to the elbow-joint, and due to an affection of superficial branches of the circumflex or of the musculo-spiral nerves. I have treated many of these cases, both in medical men and others, and in only two have I failed, and in these two opportunity was not afforded me of continuing the treatment for a sufficiently long period of time. I have notes of these cases months and years after the attack and the treatment, and have been delighted to find that the cure in almost every case has been permanent.

The pain that frequently persists after fracture or sprain readily yields to high-frequency massage.

I have already reported the results of high-frequency treatment in patients suffering from insomnia, and I may repeat that I am still unaware of any better means of restoring sleep than by these currents. They seldom fail. Drugs, of course, will produce sleep, but they give rise frequently to evil results, and sometimes the cure is worse than the disease. The milliampèrage must be high if cure is to be effected, especially if the insomnia has been of long duration.

It is well known that boils and enlarged glands, especially in the cervical region, yield to high-frequency currents applied locally, and the same may be said of ulcers on the extremities. In expert hands there is not the slightest danger connected with these currents, which cannot always be said of the *x* rays.

Constipation, too, may be successfully combated by means of the local application of high-frequency currents to the abdomen. The abdominal muscles are made to contract rhythmically, and it is probable that the muscles of the bowel may also be acted upon in the same fashion. Atony of the bowel, dilated stomach, and mild cases of mucous colitis are also benefited, especially when the currents are applied through the medium of a tongue and a rectal electrode.

The incontinence of urine of a functional nature in children, as a rule, yields to high-frequency treatment directed to the hypogastrium; while haemorrhoids and fissure of the anus can frequently be cured by rectal electrodes without surgical interference. Other functional

conditions, such as chorea and spasmodic wry-neck, are also overcome by high-frequency currents, chiefly by the employment of electrical massage.

A few years ago I published a number of experiments showing that high-frequency currents had a marked effect in raising the peripheral temperature on the surface of the body, especially in the extremities. Dilatation of the peripheral blood vessels, in addition to improving the local circulation, diminishes resistance to the cardiac systole, and hence is beneficial in lessening undue contraction of the arterioles and the strain which this condition throws upon the heart.

By numerous experiments I have also shown that these currents have an undoubted influence in encouraging elimination of waste products from the kidneys, bringing about a normal ratio between uric acid and urea excretion. A better metabolism within the human economy occurs, and as a result increased appetite is produced and the patient puts on flesh.

Among the various affections of the skin, psoriasis, eczema, and acne yield frequently to the application of high-frequency currents by means of the brush discharge, or of a glass electrode connected with the top of the resonator.

I may report also that the use of high-frequency currents, both locally and generally, in cases of muscular rheumatism and lumbago, and in rheumatic affections of joints, when there is no rheumatoid arthritis, gives pleasing results. Even in rheumatoid arthritis pain may be sometimes considerably alleviated.

Then there is the large class of neurasthenics who derive undoubted benefit from high-frequency treatment. Perhaps suggestion may be responsible for part of the effect, but so many able-bodied men and women free from all signs of ordinary neurasthenia, but nervously overtired through overwork, have shown such improved nerve tone that I am reduced to the conclusion that there must be more than mere suggestion at the root of the improvement. For people who are busily engaged at their work during the day it is of the greatest advantage to be able to obtain an increase of nerve energy in their own city, without having to relinquish their work and go from home for an extended holiday.

It can easily be understood that in nervous affections, where tissue change has occurred in the nerve substance, especially in that of the spinal cord, little or no benefit may be expected, and yet accompanying those serious nerve lesions there is usually a number of symptoms of a more superficial nature which are considerably relieved by high-frequency currents.

Let no one say, therefore, that high-frequency currents have had their day, or have been weighed in the balance and found wanting. Those who make such statements have either failed to investigate these cases sufficiently thoroughly or have pursued the treatment with insufficient care and determination. The ordinary routine practice in hospital, where patients are handed over to a nurse who knows nothing more than how to turn on the switch, is most unsatisfactory and unscientific. This is even dangerous, since these currents are capable of doing harm when improperly applied.

General practitioners sometimes complain that their patients do not derive much benefit from high-frequency treatment; but on inquiry it is usually found that the fault is due to themselves, for having placed their patients at the mercy of some bath attendant or unqualified person as little capable to apply electricity as to perform a major surgical operation. It is a misfortune both to individual patients and to the reputation of electrical methods that ignorant persons are permitted to carry out electrical treatment indiscriminately and without skilled medical supervision. I claim that no one should be allowed to treat patients electrically except those who have obtained a recognized medical qualification. In the hands of a qualified and expert electro-therapeutist high-frequency currents can be made to accomplish most gratifying results in the way of relieving pain and promoting comfort in many sufferers. The more I deal with high-frequency currents the more I am convinced of their efficacy and beneficial influence. To say that their day is past is to confess ignorance of the subject and due to a failure to master the detailed application of this valuable method of treatment.

DISCUSSION.

Dr. SAMUEL SLOAN (Glasgow) said that Dr. Somerville's paper might appear to some to be a glorification of high frequency as a universal panacea, but in reality his statements were very modest. High frequency had passed through several phases. In the beginning it was boomed as capable of successfully treating every disease. When he (Dr. Sloan) began it he had something like that feeling. There followed a phase of scepticism, in which high frequency fell into some disrepute, but now, speaking for himself, he had reached a stage at which he was confident of the efficacy of the treatment. For two or three years he studied the physiological action of these currents, and he came to the conclusion that in cases of cardiac debility small doses of autocondensation acted as a tonic, and that in cases of nervous debility large doses acted as a sedative. These high-frequency currents by autocondensation ought to produce a certain amount of neuro-muscular fatigue, and if they did not produce this—short of producing exhaustion—they probably did no good at all. If, after an application of high frequency, the patients kept quiet on a couch they received an amount of benefit proportional to the neuro-muscular fatigue which they had suffered. The value of high frequency in certain conditions of the gastro-intestinal canal was seen in increase of appetite and removal of constipation. To any one who had tried these currents and had been disappointed with them he would say this: High-frequency currents were tonics. They all had their special tonics, but they knew that the use of a particular tonic would often have no effect. Tonics were not applicable to all cases, and it might be that something was needed in association with the tonic. Change of air, they knew, would sometimes do good, and at other times it would do harm. They had had patients who had gone away on holiday and had returned without being in the least improved. But if they would have a tonic in the shape of a course of high-frequency currents before going away, the holiday might do them a great deal of good. With regard to the effluve, for a year or two he refrained from using it. He possessed great faith in it to begin with, but not afterwards. His disappointments were due to the fact that he had used it as an electrical application. When he used it as a thermic application and a counter-irritant he found that he got very good results. Lately he had been using it in certain spinal conditions, and had found the ataxia and the muscular irritability diminish.

Dr. C. F. BAILEY (Brighton), referring to Dr. Somerville's condemnation of the practice of allowing nurses to administer high frequency, said that he had found in certain cases that the high-frequency treatment carried out by an unskilled person, such as a nurse, was of considerable benefit. One case under his care presenting more or less the symptoms of progressive muscular atrophy certainly improved under high frequency thus applied. He had found the effluve of great value in many cases of brachial neuritis, and pain inside the knee also yielded to this form of treatment. He was still of the opinion that the efficacy of high frequency was largely a matter of microscopical massage of the tissues and a certain amount of battery of the small nerves. He had found cases of brachial neuritis which had been for a long time under drug treatment and massage, and the effluve was the one thing that benefited them.

TYPES OF PHTHISIS FROM THE RADIOGRAPHER'S POINT OF VIEW.

By ALFRED C. JORDAN, B.A., M.D.,
Medical Radiographer, Guy's Hospital.

MY experience of phthisis extends to the examination of more than 1,000 patients during the last four years. With regard to the early diagnosis, in my experience every case in which there are definite physical signs, however slight, can be demonstrated by an *x* ray examination, and the exact extent and distribution of the lesion can be shown. Many cases which show no definite physical signs can be similarly revealed by an *x* ray examination. There are a few early cases with no physical signs where the positive diagnosis of phthisis depends upon the discovery of tubercle bacilli in the sputum, or upon a positive tuberculin reaction. There are other early cases in which the

physical signs are purely bronchial in character—for example, crepitant sounds produced in the small bronchioles. In many of these cases an *x*-ray examination will reveal a definite lesion in the lungs, but a few are encountered in this category in which the lungs appear perfectly normal. To state the case plainly, it appears that a catarrhal lesion confined to the air tubes gives rise to no increase of density of the lung tissue, and hence causes no abnormal want of transradiancy. As soon as congestion or fibrosis appears, even in a small degree, a want of clearness is produced and gives rise to the appearances characteristic of the disease. We may thus have acute bronchitis without any radioscopic change.

In examining the chest for phthisis we note, first, the cardiac shadow. It is very common to find the heart of phthisical patients to be small, especially the left ventricle. This is frequently the natural condition of the heart in persons who are liable to become consumptive, such persons being of a feeble, non-muscular build. The advent of pulmonary tuberculosis leads to an accentuation of the want of muscular development of the limbs; the left side of the heart, having less work to do, becomes still further reduced in size and in muscularity. The heart thus becomes almost a symmetrical organ; it is narrow, and is placed vertically, or almost vertically, in the thorax.

We next observe the diaphragm. In phthisis the diaphragm is usually raised on the affected side, and its movement with respiration is considerably restricted on the affected side. This restriction is very obvious in unilateral phthisis. When both lungs are affected the diaphragm moves deficiently on both sides, and is often practically immobile.

With regard to the lungs, phthisis cases, from the point of view of the *x*-ray examination, fall broadly into two classes: apical phthisis and fibroid phthisis. An apical lesion is shown by an impairment of transradiancy at one or both apices. This impairment is not uniform, but is blotchy or mottled, and does not pass imperceptibly into the healthy lung; there is a more or less defined, though irregular, margin separating the consolidated from the normal lung. On deep inspiration the normal lung becomes clearer, and the contrast between it and the consolidated lung at the apex becomes still better defined. A phthisical cavity is seen as an irregular clear area surrounded by a dark area of congested lung. The appearance of any particular cavity varies from time to time. When full of phlegm it is usually far less clear than after the cavity has been emptied of sputum by an attack of coughing.

The appearance of an apical lesion gives no indication as to the state of activity of the tuberculous process. An old healed apical scar throws a shadow which is indistinguishable from that of a recent active lesion. The methods which have been suggested to differentiate between a congestive tuberculous lesion of the apex and a healed cicatrix are, in my experience, quite unreliable. We have thus usually to confine ourselves to a statement of the extent and position of the lesion, and of the degree of movement of the diaphragm, while it must be left to the pathologist to ascertain the degree of activity of the disease.

The second main type of phthisis I have deliberately classed under the general name of "fibroid phthisis." There is normally at the root of the lungs a certain amount of opacity. This consists usually of a band of shadow approximately parallel with the margins of the heart; from this band shadows radiate for a short distance into the clear pulmonary area. The degree of this radiating opacity which may occur in health is very variable in individual cases. On the whole, it grows more distinctly visible with advancing years. The radiating shadows may pass out almost to the periphery and down almost to the base in a patient in whom there is no suspicion of disease of the lungs. When the linear shadows are in part converted into mottled patches, or when they are accompanied by mottled patches, then we are certainly dealing with lungs which are affected by disease, and the greater the amount of mottling the more extensive is the disease. With advancing disease the mottled areas coalesce, producing blotches of varying size. In progressive fibroid phthisis the central opacity at the root becomes greater in size and density, so that in fairly advanced cases there are large opaque masses at the roots of the lungs. In a typical case of fibroid phthisis the radiating mottling is most intense at the roots, diminishing toward the base and toward the periphery, and diminishing upwards toward the apex, which either remains clear or is the part least affected. It is not uncommon, however, to find the apical and the fibroid type combined. In these cases the radiating mottling diminishes from the root upwards, but increases again at the apex.

Coming now to bronchiectasis, the author has examined some dozens of patients sent to him with the diagnosis of bronchiectasis. These cases have been found to be of two kinds. First, those in which the lungs have appeared normal. There is no doubt that in these cases the correct diagnosis was septic bronchitis, and not genuine bronchiectasis. Secondly, cases which showed the appearance typical of fibroid phthisis, that is to say, dark masses at the roots with shadows radiating from them. This group includes many cases where there was definite clinical evidence of bronchiectatic cavities. It is certain that the tubular cavities which frequently occur in bronchiectasis are so densely surrounded by fibrosed and congested lung that the nett appearance is one of increased opacity, the cavities, as such, being invisible to the *x*-ray examination. The author has observed two cases only in which bronchiectatic cavities have been definitely visible on the fluorescent screen; in one other case the cavity was due to a carcinomatous stricture of the oesophagus with a perforation communicating with the root of the right lung. A bismuth emulsion was given to the patient to swallow. At the middle of the oesophagus there was an obstruction, and while a thin stream of the emulsion ran through to the stomach, another stream ran horizontally to the right and converted the clear cavity at the root of the lung into a dark area. Within a quarter of an hour the patient coughed up a quantity of sputum in which some of this bismuth emulsion was present.

In old fibrosis the whole or the greater part of the lung is opaque and the heart is usually drawn toward the opaque side; the heart is frequently completely lost to view in the opaque fibrosed lung.

In emphysema the barrel shape of the chest is represented by the position of the ribs. They are more horizontal and wider apart than normal. The expanded lungs are more transradiant than normal, and any accompanying foci of pulmonary tuberculosis stand out in relief. Hence phthisis is very readily detected in the presence of emphysema, although clinically, emphysema especially when accompanied by bronchitis, frequently makes it impossible for the physician to determine whether phthisis be present or not.

The diaphragm is depressed on both sides in emphysema. The cardiac shadow is usually vertical and very long. This is in part due to the low position occupied by the diaphragm, and in part to the circumstance that the heart, being pressed upon by the expanded lungs, is caused to revolve upon its axis, the apex turning forward.

In pleural effusion it is important to make a careful examination of both lungs, particularly the apices, as it is very common to find an early tuberculous lesion. For this examination the patient must always be in the vertical position, and in case the patient has been kept lying in bed he should be caused to sit up for fully twenty minutes before the examination to enable the fluid to make its way to the bases of the lungs. We must bear in mind that a large pleural effusion causes compression of the lung above it, so that the lung is never quite clear above an effusion of considerable size. In all cases of pneumothorax and of hydro-pneumothorax or pyo-pneumothorax we must also be on our guard lest we fail to notice the presence of phthisis.

Other conditions frequently arise in which an *x*-ray examination at once clears up a doubtful diagnosis. Thus pneumonia, acute or chronic, is frequently found to be, in fact, due to phthisis. An abscess of the lung may also give rise to an erroneous diagnosis. An abscess usually takes one of two distinct forms—either it is seen as a dark area with ill-defined outline gradually merging into the normal lung, or as a cyst-like collection of fluid (a round dark area) or of fluid with air (a round area, the lower part dark, the upper part clear, with a sharp horizontal line of separation). These cyst-like collections of pus, or of pus and air, are contained in a dilated bronchial tube.

Small collections of this kind have been shown to occur in acute pneumonia without giving rise to any special signs or symptoms. They disappear without ever giving any indication of their presence beyond their discovery by *x*-ray examination.

New growths in the chest are frequently diagnosed when the condition is, in fact, due to phthisis; and conversely, phthisis is frequently thought to be present when there is a new growth invading the chest. The appearances of new growth are extremely variable. The opacity is often very considerable, and its distribution is, as a rule, unlike that seen in phthisis. Irregular masses occur, some of which may have well-defined rounded margins. The growth may start from the mediastinal or bronchial glands, from the pleura or from the lung itself; it may, of course, be either primary or secondary. It is surprising to find that thoracic diseases so dissimilar as phthisis and aneurysm of the aortic arch may be confused, yet this frequently occurs, and an *x*-ray examination reveals the error at once.

In conclusion, it is now beyond any possibility of dispute that the Roentgen ray method is an indispensable diagnostic aid in all pulmonary diseases, and that it is capable of demonstrating the exact position and extent of the pulmonary lesion, even in very early cases of phthisis. It is none the less necessary, however, to make careful clinical and pathological examinations to ascertain the condition of the patient, and the degree of activity of his lesion. Thus, after a long course of sanatorium treatment, when the patient appears to have completely regained his health and weight, being entirely free from pyrexia, and failing to respond to the tuberculin test, while there are no longer tubercle bacilli in the sputum, an *x*-ray examination may reveal practically the same lesion as was shown before the course of treatment, and care must be taken to explain to the physician the fact that a healed fibrous cicatrix gives rise to a shadow in the lung very similar to that due to an active congestive lesion. This fact may be demonstrated in the *post-mortem* room.

SOME POINTS IN THE X-RAY DIAGNOSIS OF PULMONARY TUBERCULOSIS.

By G. HARRISON ORTON, M.A., M.D.,

Medical Officer in Charge of *X*-Ray Department, St. Mary's Hospital; and of the *X*-Ray and Electrical Departments of the Royal Free Hospital.

THOUGH much has now been written concerning the *x*-ray diagnosis of pulmonary tuberculosis, there is still a great deal of uncertainty as to the value of this method of examination. There are some who maintain that it gives no information which cannot be obtained by other means; others (possibly a too enthusiastic few) that it is the most valuable means of diagnosis at our disposal. In other words, no unanimity of opinion exists, and it is certain that a very small proportion of suspected cases are as yet so examined.

Now, every one who has any knowledge of this method is familiar with the typical mottled shadowing which exists in definite cases of pulmonary tuberculosis, and it has been urged that any case which has advanced to such a degree as to show this shadowing could be diagnosed —at any rate, in expert hands—by other, and perhaps simpler, means. One could produce a large number of skiagrams showing this shadowing in various stages, but it is evident that they cannot represent the disease in its earliest stage; and although I am certain that a fair number of cases may advance to such a stage and yet remain undetected, it is not my intention to discuss that question to day, and I intend rather in the short time at my disposal to bear upon certain other phenomena which are to be observed in cases which show no mottled shadowing on the screen or photographic plate.

Before going further, I wish to emphasize most strongly, as I have always done, the importance of regarding the *x*-ray examination as an aid to diagnosis only, not a method to be used in place of, but in conjunction with, others at our disposal. If this be done, it must be admitted, I think, that a definite conclusion may be arrived at in many cases which would otherwise have remained doubtful.

First, then, a few words about apparatus and technique. A stand for examining the patient in the upright position is essential. There are several of these on the market, some good, some bad—the one I employ I have had specially made to my own design. The essentials are that the tube can be easily moved up and down and from side to side; this can be accomplished readily by a system of counterbalancing. The tube must be completely enclosed in a box lined with protective material; this is necessary for the protection of the operator, and also serves to cut off all extraneous light from the tube. The tube-box must be provided with some form of diaphragm which can be operated easily from a distance; the one I employ is provided with a long arm which ends in a small handle just below that used for moving the tube-box. This is easily operated by the thumb, so that with one hand one is enabled to move the tube in any direction and also to open and shut the diaphragm. In front of the frame carrying the tube-box there is a frame on castors with a canvas back. On this the patient stands, and I have had this portion made separately so that the patient can be moved away easily from the tube when it is required to make a so-called teleroentgenographic examination. From arms on the top of this frame hangs the screen, which is also counterbalanced, and so remains in any position in which it is placed. Being able thus to do all necessary movements of the apparatus with one hand, the other is free to operate the resistance, which should be within easy reach, as it is essential to be able to vary the amount of current passing through the tube without taking the eyes off the screen. Lastly, the resistance, etc, must be so arranged that any current from the minimum to the maximum can be gradually increased or decreased without any jerking or flickering of the light from the tube.

And now a few words about the preparation of the observer. It is essential that the room in which the observations are to be carried out be made quite dark. Examinations with a fluoroscope in a light room are absolutely useless. All valve tubes, etc., must be covered, so that when the apparatus is working as little light as possible be emitted into the room. With a little care this can be reduced to practically *nil*. The observer must remain in the dark, or at any rate in semidarkness (if any light is used a dim blue one seems to be the least likely to upset the luminous sensibility) for at least ten minutes before commencing the examination. This is a matter of the utmost importance, and a satisfactory examination cannot be made if it is disregarded. Beclére, of Paris, who has made a special study of this point, says: "My own experimental observations have proved by precise measurement that after ten minutes in the dark the sensibility of the retina to the light of the fluorescent screen has become fifty to one hundred times greater than it was on emerging from broad daylight. It is about two hundred times greater after twenty minutes' observation, and after a longer interval it still increases." I have dwelt somewhat on this point because although the importance of it is beginning to be recognized yet it is frequently disregarded.

With regard to the position of the patient, I always prefer, when possible, to make the examination with the patient standing up. If the patient is unable to stand, the next best position is sitting on a bicycle saddle, with the legs hanging down on either side. When sitting on an ordinary chair or stool the diaphragm movements cannot be properly observed, and are apt to be interfered with. However, in the early stages now under consideration, practically all patients are able to stand.

Examination of Apices.

I have not time to go into the *x* ray appearances to be made out on examining a normal chest, with which I expect most here are familiar. Suffice it to say, then, that with the exception of certain shadowy lines, which are always seen on either side of the mediastinal shadow, the pulmonary image is clear from apex to base. Now, although clear, there is a very decided difference in the translucency, or, as it has been termed, transradiancy of the lungs, during deep inspiration and expiration respectively. The greater amount of air contained in the lungs during deep inspiration renders them more permeable to the rays—a fact which is evidenced by the brightening or increased fluorescence of the screen during this act. Now a failure to brighten of one or other of all apices during deep inspiration is one of the earliest signs of pulmonary

tuberculosis, and can be observed long before any mottled shadowing is to be made out on the screen or photographic plate. In order to study this phenomenon satisfactorily it is necessary to pay very special attention to the details of technique. In the first place, the luminous sensibility must be as acute as possible, for reasons which I have already mentioned. In the second place, it must be possible so to adjust the rays that the area under examination is barely illuminated. And, lastly, a ray of low penetration should be employed. It will be quite easy to understand that, with a large amount of current passing through a tube emitting rays of high penetration, such as is frequently employed for screen examinations, small differences in density between the apices and also slight changes in translucency between deep inspiration and expiration respectively would be quite unobservable; and equally easy to understand, that unless the luminous sensibility be acute, nothing could be seen at all with the tube adjusted in a manner such as I have described. If all the necessary precautions be taken, however, there will be no difficulty in many cases of demonstrating this failure to brighten, even to the untrained eye, though there are, of course, other cases in which the changes may be visible to the trained eye only.

It may frequently be noted on screen examination that one apex appears somewhat dimmer than the other, at times no doubt due to an unequal muscular development on the two sides. To this sign alone, however, I do not attach any importance, but a failure to brighten is quite a different matter, and means deficient air entry. I need scarcely add that this examination must not be considered complete until the apices of both the upper and lower lobes of both sides have been carefully examined and the facts noted.

It has long been known that a lesion as a rule does not start at the extreme apex, but at a point about 1½ in. or so below this—a fact which was pointed out by Dr. Kingston Fowler many years ago, and which can be demonstrated frequently with the aid of the rays.

We will now proceed to the discussion of the movements of the diaphragm.

About one year after Professor Roentgen's discovery Dr. Williams of Boston pointed out the importance of the study of the diaphragm movements, and the limitation of movement so frequently observed in cases of pulmonary tuberculosis has frequently been referred to as "Williams's sign." Now, although the fact that a limitation of movement of the diaphragm does take place is admitted by most, if not all, observers, there is nevertheless a great diversity of opinion both as to its value, the stage of the disease at which it appears, and its constancy, and I shall hope to learn something to-day from the observations of others.

My own opinion is that this limitation of movement appears at a very early stage, and is often coincident with the early failure of an apex to brighten already referred to. In some cases it may be very marked, the diaphragm appearing to be practically fixed; in others it may require somewhat careful measurements to detect it. With regard to the constancy of this sign, I should not like to say that it is to be observed in all cases, though I think it possible it may be present in all at a certain stage of the disease, but may have passed off in some before the case comes under observation. As the disease tends to become arrested, cured, or chronic, this sign undoubtedly passes off, and in certain cases the range of movement on the side most affected may equal or even exceed that of the side less affected. It is this variation in the range of movement with different stages of the disease which no doubt accounts for many of the discrepancies of opinion as to its value and constancy, the sign being more or less marked or even absent according to the stage at which the case comes under observation. Here for a few moments let us return to the failure of an apex to brighten, the variations in which to some extent are comparable with those of the diaphragm. I have mentioned that when the disease was active the failure to brighten was not absolutely localized to the region of the commencing lesion, but could be observed over a wider area. In a few cases, with a small amount of shadowing, I have observed that the apex brightened, and I am of opinion that if such a shadow be present and the neighbouring lung brightens well on deep inspiration, the shadow is due to a small lesion which has become arrested.

It is not difficult to understand in the early stages and in non-chronic active cases, that this limitation of movement is part of Nature's means of procuring rest, but that later, when the disease has become arrested or chronic, a certain variable amount of lung tissue having been destroyed, the diaphragm takes on, so to speak, a compensatory movement, in order to enable the remaining healthy lung to do the extra work required of it; and the same argument may be applied to the behaviour of the apices. In the year 1904 Dr. David Lawson published some interesting observations he had made on a series of patients where active disease was present, and again later after they had undergone a course of hill climbing and arrest had been secured. In such cases, he states, "it has frequently been observed that the diaphragm upon the affected side during the stage of active disease moved less freely than on the sound side, but that, as convalescence proceeded and compensatory breathing became established, the diaphragm gradually altered the character of its movements, until at length the side which exhibited impaired movement came to show a movement which equalled or even surpassed that of the other side, the limitation of movement thus corresponding to the period of activity of the disease.

I shall be interested to hear if there are any present who have carried out observations on similar lines, for in large general hospitals, where most of my work has been done, it is often not easy to keep an eye upon the cases in a way that can be done in a sanatorium. In many points my own observations correspond with those of Dr. Lawson. The statement, however, that the limitation of movement corresponds with the period of activity of the disease holds, in my experience, up to a certain stage only, for in very chronic cases an exaggerated movement may be present in cases in which the disease is undoubtedly active. In such stages of the disease, however, the diaphragm movements are not of such import, as there are many other signs present on which to base a diagnosis.

Before leaving this subject, I should like to point out that the movements on both sides during ordinary and during forced respiration should be carefully noted, and, further, measurements should be made with the screen both on the front and back of the chest, for it has been noted by several observers that the amplitude of movement of the diaphragm varies with the situation of the disease, being more limited posteriorly when the lesion is on the posterior part of the lung, and *vice versa*.

There are various other alterations in the movements, and alterations in the shape of the dome of the diaphragm which may be observed in many cases, but it is not my intention to discuss these to day. Some are, no doubt, due to pleural adhesions, but I feel confident that the limitation I have just discussed is not, in the majority of cases at any rate, the result of such adhesions, as has been frequently asserted.

The failure of an apex to brighten and the limitation of movement of the diaphragm is a marked feature in early pneumonia, and in the later stages after the cure of the disease I have been able to watch the gradual return to the normal of the diaphragm movements, which is, as a rule, some considerable time after the disappearance of physical signs. This fact shows the importance of taking all the facts of the case into consideration, as the later stages of a pneumonia might easily be mistaken for tuberculosis if reliance were placed on the *x*-ray findings alone.

I have no time to enter into the subject of the small vertical heart and narrow aorta, so frequently associated with pulmonary tuberculosis, and considered by some to be one of the dystrophies which predispose to this disease, but I hope the few remarks I have made will lead to some discussion which will help towards producing some finality of opinion with regard to the points I have touched upon.

DISCUSSION.

Dr. W. B. KNOBEL (Midland Open-air Sanatorium) thought it a pity that any rivalry should be suggested between *x*-ray experts and physicians. Each appeared to think that his method was the first to show the early

signs. In his (Dr. Knobel's) opinion the early diagnosis of phthisis depended upon the consideration of every possible sign and symptom, and the value of the *x* rays in adding to the evidence was undoubted. He pointed out that the early signs, such as the deficient expansion of the chest, the impairment of percussion resonance, the failure of the apex to light up, and the limitation of the movement of the diaphragm—in a word, the early physical and *x*-ray signs—were surely due, not to the actual lesion directly, but rather to a loss of function of the lung, caused probably by the local action of toxins. Taking a case such as he had indicated, showing these signs and symptoms of infection, it would be found, after treatment had resulted in arrest of the disease, that the expansion of the chest had improved, the resonance had been restored, the apex had a better illumination, and the diaphragm a better movement. But if an *x*-ray shadow were present before treatment it would be present after treatment also, and would be exactly, or very nearly, the same two years after the arrest of the disease. The shadows seen on a plate were of no use at all in the diagnosis of active consumption. It would be ridiculous if he were to show plates illustrating cases after successful treatment, and from the presence of shadows an active disease were to be diagnosed. It was only by the screen examination that the activity of a disease could be detected. He thought he could say that in his experience in every case, or perhaps in nine cases out of ten, the *x*-ray plate showed more disease to be present than could be found by physical examination. The plate was a better means of determining the extent of the lesions than the physical method. An *x*-ray examination would detect the disease, would show that there had been a lesion there when it could not be found by physical means. The same thing applied to cavities which gave rise to no definite physical sign. The point with regard to the inability of the plate to furnish evidence of active disease was one which should be made clear to the general profession.

Dr. C. F. BAILEY (Brighton) said that his experience confirmed that of Dr. Knobel with regard to the greater extent of the disease shown by the *x*-ray examination. In cases where physical examination suggested that only one lung was affected, the subsequent examination with the *x* rays showed the other lung to be affected also, while a lung known to be affected was shown to be more deeply affected than was originally believed to be the case.

Mr. THURSTAN HOLLAND (Liverpool) thought that it ought not to go forth as an uncontradicted statement that the *x*-ray appearances of arrested disease did not disappear entirely. Dr. Knobel had said that they did not, but he (Mr. Thurstan Holland) had had to do with the diagnosis of pulmonary mischief in many children—pulmonary mischief that was undoubted from every point of view—and in cases in which there had been an eventual recovery he had found absolutely nothing in the chest, as shown in the radiograph, to indicate that any disease had existed at all. He went on to point out that a great deal of their plate work had been done on plates which necessitated time exposures. Many of the so-called facts that were obtained by means of time exposures would have to be altered. Diagnostic test-plates must be taken, without any intensifying screen, in a fraction of a second, and it was perfectly easy to do this with modern apparatus. An important point for consideration was the legitimacy of relying upon the absence of signs. After using plates of highest quality and employing the best technique, were they justified in saying, in the absence of any *x*-ray sign, that the case was not one of tuberculosis? He had had a long experience, and although, of course, it was difficult in one's work to keep trace of patients, he did not remember a single case in which a carefully conducted *x*-ray examination, having negatived the suspicions of good physicians, was proved to be wrong by the subsequent history of the patient. He was inclined to think that a very careful negative examination was almost as reliable as a carefully conducted positive one, and that when there was not the slightest evidence of any *x*-ray sign of any sort the future history of the case would yield nothing to justify the suspicion that it was one of tuberculosis.

Dr. JAMES METCALFE (Bradford) said that it seemed to him that the general physical signs, if not obtained in the early stages, were often ignored. In his opinion this was a very important point, having regard to the early sanatorium treatment of phthisis. There was no doubt whatever that early treatment was adopted after *x*-ray examination much more frequently than after some very early physical signs. There was fairly general unanimity among *x*-ray workers as to the *x*-ray signs about which Dr. Orton had spoken—deficient illumination of the apex and limitation of the diaphragmatic movement—but the differential diagnosis was so very important that too much stress could not be laid upon the *x*-ray method of examination.

Dr. A. HOWARD PIRIE (St. Bartholomew's) said that he had reduced the impeded movement of the diaphragm to three causes: (1) Adhesions about the lungs certainly stopped the movement of the diaphragm; (2) disease in the lung produced a reflex action, showing the need for the inflamed lung to have rest; (3) in the parts where there had been disease the quantity of lung tissue was decreased, and therefore the diaphragm was not required to move so far. Dr. Orton had not referred at all to the glands which one saw so frequently at the root of the lung. These seemed so common that one almost came to regard them as normal among people who lived in towns.

Dr. A. E. BARCLAY (Manchester) said that his experience in bronchitis and similar conditions was that there was no limitation of movement of the diaphragm. Would Dr. Orton give his experience?

Dr. ORTON, in reply, said that he did not know what extent of shadow Mr. Thurstan Holland had seen clear up after the arrest of the disease. It was certainly a fact that little shadows did not clear up. He had not been able to watch individual cases sufficiently long to form a final judgement, but he had seen small areas of the disease represented by the *x* rays when the disease was no longer active. There was no doubt that on this point Dr. Knobel was right. He agreed with what Mr. Holland had said about the uselessness of the intensifying screen in making a diagnosis in a supposed case of pulmonary trouble. The screen was useful for bismuth stomachs, but in chest work the mottling or grain was usually so evident as to vitiate the result. Mr. Holland had asked whether, in the absence of *x*-ray signs, the patient could be said conclusively to be free from tuberculosis. He (Dr. Orton) believed in the general sufficiency of a negative *x*-ray diagnosis. Some patients under his care at Victoria Park had some physical signs, but the *x*-ray appearances were absolutely negative. The diaphragm moved well and the apex brightened. In three of them, at all events, subsequent events had proved the correctness of the *x*-ray diagnosis and the absence of anything tuberculous. With regard to Dr. Pirie's analysis of the causes for the impeded movement of the diaphragm, there was no doubt that a few cases were due to very old adhesions, but the bulk of the cases were due to Dr. Pirie's second reason, namely, reflex inhibition, which took place in order to enable the inflamed lung to be at rest. In some of his observations he had noticed rather an exaggerated movement of the diaphragm in chronic cases. In answer to Dr. Barclay's question: in bronchitis, as a rule, there was absolutely no limitation of the diaphragmatic movement, and frequently, unless the case was extremely chronic, there was no mottling. The glands at the root of the lung, as Dr. Pirie had said, were often very prominent in town-dwellers, but he was not at all sure that they were tuberculous. They were black-looking, their colour evidently being due to the large amount of coal-dust which found its way into the lungs of those who lived in the great centres of population. With regard to dry pleurisy, he had seen a few cases with some limitation of movement of the diaphragm.

THE VALUE OF SCREEN EXAMINATION IN THE DIAGNOSIS OF RENAL CALCULUS.

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IN the *x*-ray diagnosis of renal calculus I wish to insist, in the first place, on the necessity of careful screen examina-

tion, as without it many important points bearing on the diagnosis would otherwise be overlooked.

The advantages of screen examination are:

I. The correct quality of rays for the particular case in hand can be obtained.
II. The kidney triangle can be accurately illuminated.
III. The movement and position of any shadow or shadows can be noted; and
IV. The shape, size, and density of any shadow can be observed, and also whether the object causing it is nearer to the anterior or posterior abdominal wall.

I.—*The Correct Quality of Rays.*

It is obvious that if the rays from a Crookes's tube are not sufficiently penetrating to pierce the body of the patient under examination, one cannot expect to see, much less to radiograph, a calculus. On the other hand, if the rays are so penetrating that they show little or no contrast between the bony and soft parts, many calculi would escape detection. The quality of the rays should be such that the twelfth rib and the transverse process of the first lumbar vertebra are sharply and clearly defined.

The penetrating power of the rays, therefore, must vary according to the opacity of the patient; and this can only be accurately ascertained by screen examination.

II.—*The Kidney Triangle can be Accurately Illuminated.*

If the kidney is in its normal position, the shadow of a calculus, provided the position of the *x*-ray tube is properly adjusted, is, in nearly all cases, within an imaginary triangle—called the kidney triangle—one side being formed by a line along the upper border of the last rib, the second by a line joining the tips of the transverse processes of the upper three lumbar vertebrae, and the remaining side by a line making an approximately equilateral triangle.

This area should be clearly illuminated, and free from that mottling, due to gas in the large intestine, which so frequently gives rise to difficulty in the correct diagnosis, especially if the calculus is one which is only slightly more opaque to the rays than the surrounding tissues. This source of error can only be eliminated by careful screen examination and the removal of the cause, when present, by obvious means (diet, aperients, etc), and a further examination made.

III.—*The Movement and Position of any Shadow or Shadows can be Noted.*

A shadow seen in the triangle described, if due to calculus, moves either directly downwards or downwards and slightly outwards along the edge of the psoas muscle, on deep inspiration. If a shadow does not move, or moves downwards and inwards towards the spine, or upwards, or more than two inches, it very probably is not caused by calculus but by other conditions which will be enumerated later. This movement of the kidney on deep inspiration is quite considerable—from one to two inches—and much more than is generally supposed.

Occasionally one finds that the shadow of a calculus, especially in women and on the left side, is obscured by the last rib, so that if a radiograph alone is relied on, it could very readily be missed. Screen examination will prevent this error, for on deep inspiration the calculus comes down from behind the rib and can readily be seen. I have had several cases illustrating this point, which is, I consider, a very important one. Then by screen examination one is enabled to detect with more certainty multiple calculi. I have been able to count as many as seven calculi in one case, no larger than a small pea. On operation seven were found, no more and no less. In this case a plate was taken, and I am quite sure that a confident diagnosis could not have been made from it on account of want of definition from the slight movement of the kidney due to quiet respiration. In the case of multiple calculi, again, they may lie so close together that a radiograph would cause them to appear as one. Screen examination will disprove this, and the surgeon must not be satisfied until he has removed them all.

Then again, if multiple shadows are seen, and they do not all move to the same extent, and in the same direction, relatively to each other, they cannot all be due to calculi. I did not fully appreciate this fact in a case I examined for Mr. Littlewood some time ago. I diagnosed a medium-sized calculus in the pelvis of the left kidney, and several smaller ones in its lower pole. The upper shadow moved downwards and slightly outwards with inspiration to the extent of about 1½ in., but the lower shadows moved downwards to a much greater extent, and distinctly inwards towards the spine. On operation a calculus was found in the pelvis of the kidney corresponding to the shadow seen, but the lower pole of the kidney was free from calculi. At a subsequent abdominal section several calcified mesenteric glands were removed in the position stated, and further *x*-ray examination proved that all the shadows had disappeared. If I were investigating a case of this nature again with my present knowledge and experience I think this error would be avoided. I have had three cases, proved by operation, where shadows were seen in the renal triangle but which I diagnosed as due to calcified mesenteric glands, and not to calculi, on account of their movement downwards and inwards towards the spine. I am quite sure that if a plate only had been relied upon in these cases the diagnoses would certainly have been "renal calculus."

IV.—*The Shape, Size, and Density of Shadow.*

Again, the shape and size of a shadow can be more accurately gauged by screen examination, and may be of help in the differential diagnosis and to the surgeon in operating. By screening from the front as well as from the back it can be determined, in most cases, whether the object causing the shadow is nearer to the anterior or posterior abdominal wall, which fact is of considerable value in forming the diagnosis of calculus. The density, also, of a shadow can be noted, and may be of assistance in some cases.

Small calculi in many instances cannot be radiographed, except with special apparatus, on account of the movements of the kidney with respiration during the exposure. They may readily be seen, however, on the screen, which further emphasizes the importance of this method.

Calculi are opaque to the *x* rays and cast shadows of greater or less density, according to their size, but more particularly according to their chemical composition. As a general rule, one may take it that elements are opaque to the rays in proportion to their atomic weights. Thus pure uric acid has the formula of $C_5H_4N_4O_3$, the highest atomic weights of these elements being 16, oxygen. Flesh and fat are also composed of these elements, so it comes about that pure uric acid calculi are very little more opaque than the surrounding tissues, and when of small size it is almost impossible to demonstrate their presence by radiology. Fortunately, however, very few calculi are composed of pure uric acid alone; nearly all contain other elements, more particularly calcium, which has the fairly high atomic weight of 40. Quite a small percentage of calcium will cause a distinct difference in opacity between a calculus and the surrounding tissues.

By noting the size, shape, and intensity of a shadow of a calculus one can form quite a good opinion as to its chemical composition.

In the second place, I wish to insist, in the accurate diagnosis of calculus by the *x* rays, on the importance of cutting the area illuminated down to its smallest possible dimensions. This point has not been sufficiently appreciated by radiographers in general. This, again, can only be done by proper manipulation under screen examination. The reason of this point is obvious to any one who will take the trouble to study the question even superficially.

We know that the rays coming from a Crookes's tube as they travel through space cannot be moved out of their course by any known means, but when they strike an object secondary rays are generated which travel in all directions. It is these secondary radiations which interfere so much with the diagnosis, on account of the want of definition of the shadow cast by a calculus.

Technique of the Examination.—The patient suspected of renal calculus should for three days be put on a light diet of fish, eggs, milk, milk puddings, etc., and given a vegetable aperient, as liq. ext. cascar. t.d.s. post cibos, ♏v to ♏xv, sufficient to cause two or three loose motions a day. Salines and enemata should not be given, as they have a tendency to the formation of gas in the colon. By these means certain sources of error, which will be mentioned later, can be avoided. On the morning of examination, very little (half a pint of bread and milk) or

no breakfast should be taken. The skin of the lumbar region should be examined for pigmented moles, as these may cause a slight shadow. The patient should be placed face-downwards on the *x*-ray couch with a cylindrical air-cushion under the abdomen just below the costal margin. The *x*-ray tube is placed under the couch in a large lead-lined box, which is free to move in any direction on wheels. On the top of this box is a square opening, the size of which can be rapidly altered by sliding sheets of heavy lead, which answer as a diaphragm. A plumb line can be quickly attached to the box and is so adjusted that the "bob" is vertically over the anticathode of the tube.

The advantages of this position are:

1. Easy manipulation of the screen.
2. The abdominal contents are pressed towards the spine, and therefore closer to the screen.
3. The cushion (*a*) acts as a compressor, lessening the thickness of the abdomen; (*b*) prevents to a large extent the movements of the kidney during respiration—important if a negative is required; (*c*) squeezes out the gas from the intestines over the renal area; and (*d*) puts the mesentery on the stretch.
4. The straightening out of the lumbar concavity thus allowing the screen to be placed in contact with the skin. This greatly increases the definition, as the screen is 1½ in. to 2 in. closer to the object under observation.

Whilst the patient is being placed in position the *x*-ray room should be very dimly illuminated by a blue light placed behind the operator. This makes the eyes of the observer much more sensitive to the fluorescence on the screen, especially if a few moments be spent in absolute darkness. At the side of the couch are placed three switches. The first, when pressed, turns out the blue light; the second starts the motor brake; and the third turns on the primary of the coil. Everything being ready and the apparatus suitably adjusted, a rectangle of lead fuse wire, 2 in. by 3 in., is placed over the kidney area under examination. The tube in its box is then so placed that the plumb line hangs over the centre of the rectangle mapped out by the fuse wire. The plumb line is then removed, the light switched off, and the motor started. After a few moments the rays are turned on, and the screen should be clearly and steadily illuminated. The field of illumination is then rapidly cut down by adjusting the slides of the diaphragm on top of the tube-box to the area mapped out by the rectangle of fuse wire. Shadows are then looked for, and, if found, their movement studied on deep inspiration. If no shadow is seen, the area illuminated should still further be cut down, even to 1 in. square, and further investigation made. By running the tube-box up and down the couch and from side to side the whole of the kidney area can be quickly examined. A calculus which can be quite distinctly seen through a very small diaphragmatic opening rapidly disappears when the opening is enlarged. This point I have demonstrated many times, and it can readily be understood from what I have stated about "secondary radiations."

If a radiograph is required an *x* ray plate takes the place of the screen and the exposure given.

What are the fallacies and how may these be avoided? (As I have already said, if a given shadow does not fall within the renal triangle and does not move directly downwards or downwards and slightly outwards on deep inspiration, in all probability it is not caused by a calculus.) Shadows not caused by calculus within the renal triangle may be due to:

1. Calcareous mesenteric glands. These frequently move downwards and inwards towards the spine; or many shadows may be seen, some of which are outside the renal triangle; or they may not all move equally or in the same direction on respiration; or they may move more than 2 in.; or they may be shown to be nearer the anterior than the posterior abdominal wall. Some or all of these points would help one to come to a right diagnosis, and I have had several cases of this kind.
2. Calcareous retroperitoneal glands. These would not move on respiration.
3. Foreign bodies, as pills, scybalae, etc., in the intestines. Diet and aperients will avoid these.
4. Calcareous deposits in lower costal cartilages in old people. These either do not move on inspiration or move slightly upwards. If present they are generally in a line following the direction of the cartilage. Screening from the front will clear up the point.
5. Phleboliths have been said to occur, but in my experience I have not found them in the abdomen, although they are quite common in the pelvis of people over 45 years of age.
6. Calcareous deposit in a tuberculous kidney. This in some cases cannot be distinguished from calculus, and I have had three such cases.
7. Pigmented moles on the back. These do not move and can be seen.
8. Mottling of the renal area due to gas in the intestines. Diet and aperients will correct this.
9. Gall stones. These, except in very rare instances, are quite transparent and give rise to no difficulty.

Size of the patient. The negative diagnosis of renal calculus in people over 14 st. becomes of less value in proportion to the increase of weight, and I may here state that a negative opinion should never be given unless the landmarks I have mentioned can be observed and a clear illumination of the kidney area obtained.

During the last two and a half years I have examined over 500 cases for stone in the kidney with the following result:

Positive diagnosis of calculus	90	cases.
Operated upon, and stone found... ...	79	,,
Operated upon, and calcified tubercle of kidney found	3	,,
Operated upon, and no stone found ...	4	,,
Not operated upon	4	,,

Of the 4 cases operated upon and no stone found, in 1 the stone—a small one—was passed a few days after operation by the urethra; in 2 the shadow was evidently caused by a calcified mesenteric gland; and in 1 case no cause for the shadow could be found, and it is still present. Of the other 400 odd cases in which a negative opinion was given, 13 were operated upon, and in no case was stone found. Therefore, out of 99 cases operated upon the diagnosis was proved correct in 92 cases; and if the 3 cases of calcified tubercle of kidney be added, as I think they well might be, and also the case where the stone was passed after operation, we have an accuracy of a little over 96 per cent., which I consider distinctly good.

I claim that with a proper technique the *x*-ray diagnosis of renal calculus is infinitely more accurate than the history of the case, the clinical signs and symptoms, examination of the urine, etc., all put together; but, at the same time, I do not suggest that the *x*-ray examination should come first, but that it should be employed to confirm or negative the diagnosis already made by the physician or surgeon.

Since November, 1907, at the Leeds General Infirmary, no calculus has been removed from the kidney by the surgeons which has not been previously diagnosed by *x*-ray examination. It may be of interest to mention that out of the 90 cases in which a positive diagnosis was given, in 16 cases there were multiple calculi, and in 7 cases calculus was present in both kidneys. In 8 cases in which a negative opinion was given a small calculus was subsequently passed per urethram.

In conclusion, it may be stated that radiography is very accurate in the differential diagnosis of renal calculus; that it is of great service to the surgeon in locating the stone and giving him information as to the size and shape of any calculus present, and also the number he is expected to remove. I think that practically every calculus which requires surgical interference can be detected by radiography in people under 14 st. in weight.

RADIATION AND BIOLOGICAL PROCESSES; WITH SOME REFERENCE TO THE SKOTOGRAPHIC ACTION OF ANIMAL TISSUES.

By W. S. LAZARUS-BARLOW, B.A., M.D., F.R.C.P.,
Director of Cancer Research Laboratory, Middlesex Hospital.

ON various occasions during the past four years papers have been contributed to the Archives of the Middlesex Hospital by members of the Cancer Research Laboratory of that hospital upon certain phenomena manifested by animal tissues when examined photographically and electrically. Further, animal cells have been exposed to radiation, and developmental changes subsequent thereto have been studied in some detail. These researches were summarized by me in my Croonian Lectures before the Royal College of Physicians last year,[1] but some additional results have been obtained since then which may be of interest to the members of the Electro-therapeutic Section.

It was natural, when commencing my inquiries into a possible relationship between radio-activity and cancer, that I should concentrate my attention primarily on the usual tests—photographic and electrical—of recognized radiations. I found evidence that, under certain conditions, animal substances produce a profound effect upon a photographic plate when exposed to that plate in complete darkness. This phenomenon I ventured to speak of as "skotographic," so as to avoid a judgement upon its nature. Similarly I found, as I believe, evidence that animal substances modify electroscopic leak. Here my results were in part consonant with usual views upon radio-activity, in that certain of the substances in question accelerated leak, but in part were dissonant, for in other instances they retarded leak. In all cases, however, the modification of leak was very small. On the other hand, many of these same animal substances produced a profound effect upon the photographic plate, and this disparity between the degrees of photographic and electrical effect constituted an important difficulty in the way of regarding the results as due to radio-activity.

During the past year Dr. Mottram and I have been carrying out experiments to determine the precise nature of the skotographic substance in the watery extracts of animal tissues, and without going into details which may be found elsewhere,[2] we find that the entire skotographic effect of such watery extracts is entirely to be explained by their formation of minute traces of ammonia. It must not be assumed that this is the explanation of all skotographic action, for the intense blackening of a photographic plate by some specimens of cholesterin gall stone occurs in the complete absence of ammonia from the calculus.

The amount of ammonia necessary to produce skotographic effect is excessively small, and a given specimen may continue to emit such small amounts of ammonia for a long time. Thus we have proved that a calculus mainly composed of uric acid, and removed by Percival Pott, who died in 1788, still gives off ammonia, as determined by Nessler's test, so that a filter paper soaked in the reagent and exposed to the calculus yields a picture very similar to the corresponding skotograph.

It is interesting to note that this ammonia must be in a very simple form of combination in the watery extracts and tissues, for an extract which fails to show the presence of nitrogen by sodium combustion—and it is only simple ammonia salts which react in this way—may have profound skotographic powers.

It appears, therefore, that ammonia formation accounts for at least a very considerable proportion of skotographic effect in the case of watery extracts of tissues. Whether there exists in them in addition a radio-active factor which accounts for a part of the effect it is impossible to say from the photographic results. Ammonia gas, it is true, is a better conductor of radio-activity than atmospheric air, but the amount of ammonia formed is so small as to be negligible in this respect, and though potassium has been found to be radio-active there is no evidence that the same is true of ammonium. On the whole it is safer to conclude that the skotographic effects are not evidence of radio-activity.

Turning now to another aspect of our researches—namely, the effect of various animal extracts, of certain chemicals, and of radio-activity and x rays upon animal cells—it is seen that some points of resemblance show themselves. Thus, we have subjected the ova of *Ascaris megalocephala* to the action of x rays, radium, uranium, or thorium, and have found that a dual effect is produced. In the first place, the cells divide more rapidly than the controls; and in the second place, an antagonistic action shows itself at some period during development upon certain of the cells. Thus, one finds that fully-formed living embryos make their appearance earlier in the irradiated specimen than in the control, but that the total number of eggs coming to maturity is considerably less than in the control. This dual action is seen well in the case of ova that have been exposed to x rays for twenty minutes immediately after removal from the oviduct and while they are still in the one-cell stage, or in those whose development has taken place in the presence of radium throughout. Uranium and thorium give rise to a well-marked acceleration of early stages of division alone; they do not appear to exert an antagonistic effect, even though all stages of development be carried out in their presence.

If the ova be exposed to various animal extracts under similar conditions, it is seen that analogous changes in rates of their development occur. Thus protein-free extract of testis of the herring accelerates development; a similar extract of ovary retards development; various fractional distillates of a protein-free extract of sheep's liver caused well-marked acceleration in the early stages of development, but retardation occurred at the stage when the cell masses began to elongate preliminary to the formation of worms, and living worms appeared first in the control; the residue from distillation produced a continuous slight retardation.

The resemblances between the effects of these extracts and of radiations are striking. It is true that the radiation effects are produced though the ova be shielded by a layer of mica, while the extracts, under similar circumstances, are inert, but, as will be insisted later, the egg case itself constitutes a screen for the dividing cell, to say nothing of the layer of gelatine in which they are immersed, or the layer of air intervening between them and the substance whose action is being tested.

Inasmuch as all the animal extracts that have been mentioned above possess strong skotographic powers, the effect of ammonia upon development of the ova was tested directly. It was found that solutions of ammonia of 5 per cent., 15 per cent., and 40 per cent. retard development, but that in the earlier stages the retardation was more marked in the case of the weaker solutions, while pure 0.880 ammonia actually caused acceleration in the earlier stages of division. In the later stages ammonia showed a retardation which increased with the concentration of the gas in solution. Ammonia gas derived from the hydration of solid ammonium carbonate produced similar results.

The action of formalin vapour is exactly similar to that of radium, acceleration occurring in the early stages, but fewer ova coming to maturity than in the control and living worms being first observed in the formalin specimen. This observation is remarkable from the fact that formalin vapour is extensively used in laboratories as a fixing agent for protein. It is clear that in this instance the formalin does not "instantaneously kill" the cell, but, on the contrary, favours its development. Even more, the ova will show accelerated development for four or five days, though actually immersed in pure formalin during the whole time. It is remarkable that the highly diffusible formic aldehyde—present to the extent of 40 per cent.—and the traces of highly diffusible formic acid always associated fail to penetrate the egg cases of the ova. If they penetrated even in minute quantities, all our information goes to show that they would kill the young cell forthwith. Yet a definite influence is exerted, and one which resembles that of radio-activity to an extraordinary extent, even to that of producing its effect upon the living cell when separated from it by a screen (the egg case).

It appears, therefore, that the x rays, radium, formalin, ammonia, and a variety of skotographic animal extracts have effects upon the ova of ascaris which possess many points in common, and which it is difficult to imagine are produced in a purely chemical way. Thus, one can hardly conceive a purely chemical substance as noxious to cell life when weak, but beneficial when strong (ammonia).

In the preceding experiments we have dealt with the cells in what may be termed their prenatal stage; in experiments on silkworms we have investigated the action of x rays and radium upon the post-natal individual in larval, pupal, and imago stages. These experiments are still in progress, but sufficient has been done for us to feel confident that the changes produced are in essence the same as those observed in the ovum of ascaris. In this series x rays and radium have been used according to a somewhat definite scheme in order to differentiate, if possible, between the beneficial and the injurious effects of the radiations. Thus, keeping the output of rays from the tube as constant as possible, we have varied length of exposure in a number of ways, and have dealt with the insect in various stages of its life-history. One subject upon which we hope to throw light incidentally is that of sterility under x rays, for since the sexual act is the sole function of the imago, it is clear that during chrysalid and imago stages changes are taking place subservient to this

end, and any interference therewith by radiation can well be studied by consideration of the resulting fecundity. Unfortunately, after the eggs have been laid, a year has to elapse before information upon their fertility can be obtained. Last year's experiments, owing to the fact that we were totally unaware of the doses to be used, etc., have not given conclusive results. This year we are repeating and extending the experiments.

A further line of research in connexion with radiation and biology now being conducted is rather of the test-tube variety. In 1909, Colwell and I showed that a considerable modification of the easily recognized properties of uranium and thorium is brought about by the combination of these elements with proteid (egg albumin, serum albumin). This is being pushed further, and the influence of *x* rays, radium, etc., on different kinds of protein is being investigated. It is clear that such experiments are fundamental in nature so far as consideration of any inter-relation between radio-activity and biological processes is concerned. It is too early to enter into details, but sufficient has been done to show that this line of research will not prove unfruitful.

In making these remarks, I have been conscious of a great dissatisfaction that I could not present something more definite to the Section. It is true that I feel convinced as to certain of the results; it is true that there cannot now be any doubt that radio-activity is capable of influencing biological processes; it is probable that processes at work in lowly organisms differ but little, if at all, in principle from those at work in the cells of higher organisms, and therefore that the work on which we are engaged will become at some later date available for the human being. But the difference between the action of a Crookes's tube or a milligram of radium upon the ovum of a worm or upon an insect and that of the ever-present slightly radio-active environment in which complicated living organisms pass their life-history is so enormous that one hesitates to hope for great results. It is lawful, however, to remember that modern electricity and modern bacteriology had humble beginnings, even though we are astonished at our own temerity in attempting to unravel the relations between those two elusive processes, radio-activity and life. And at least we may feel satisfied that such results as we put forth have been obtained from actual experiment and not from armchair speculation.

REFERENCES.
[1] BRITISH MEDICAL JOURNAL, June 19th and 26th, 1909, pp. 1465 and 1536. [2] *Arch. Middlesex Hospital*, Ninth Cancer Report, 1910.

DISCUSSION.

Dr. H. D. MCCULLOCH (London) asked Professor Lazarus-Barlow whether, in view of the essentially molecular action of radio-active agents in general, and the apparently paradoxical and unexpected phenomena of the potent chemical agents to which he had alluded, the "accelerations" and "retardations" were not evidence of essentially molecular, as distinguished from chemical, changes. He referred to the molecular systems in the proteidagenous matter of the living cell, and the important part played in the biochemistry of the cell by the enormous molecular constitution of the lecithins and their derivatives, which had recently attracted some attention.

Dr. LAZARUS-BARLOW said that this was clearly one of the pieces of work which ought to be done. It was an excessively difficult subject, but they were undertaking some investigations along that line. It might be many centuries before they were of any practical value.

The PRESIDENT, in thanking Dr. Lazarus-Barlow for his contribution, said that the working out of the ever-closer relationship between physical science and biological processes was extremely fascinating.

THE CONSTITUTION AND ORGANIZATION OF THE X-RAY DEPARTMENT OF A GENERAL HOSPITAL.

By G. ALLPRESS SIMMONS, M.D.,
Senior Radiographer, St. George's Hospital, London.

THE constitution and organization of the *x*-ray department of a general hospital is now a matter of great importance for the efficient working of the hospital.

A large number of the members of this Section are actively engaged in conducting such a department, and many of us have founded them; and seeing that it has fallen to my lot to organize and inaugurate the *x*-ray departments of two London general hospitals, and to be associated with those of two others, I have acquired a pretty complete knowledge of what is required of such a department and how to try to meet those requirements; and I think a very brief record of my experiences and a description of the electrical and *x*-ray department of the hospital with which I am at present associated may not be without interest to members of this Section.

The fairly recent introduction of *x* rays into the diagnostic and therapeutic armamentarium of hospitals, like the more extended use of pathology, bacteriology, and inoculation, has rendered it necessary for every hospital to set aside some space and some money for the purpose of an *x*-ray department; and as all hospitals alike can ill afford either commodity, the first tentative attempts at establishing *x*-ray departments were, regarded from a more modern point of view, quaint in the extreme. Generally speaking, the first beginning of such a department consisted of a cellar containing a small quantity of extremely elementary apparatus administered and controlled by some unqualified but clever man who had shown an aptitude for such work.

At St. Mary's, before I went there, *x*-ray photographs were taken and *x*-ray treatment administered by the theatre instrument beadle in a cellar in the basement, and in such time as he could spare from his duties of keeping surgical instruments in order, and I am bound to say that, considering his limitations, his work was extremely good.

At St. George's Hospital the *x*-ray department was run under precisely similar conditions by one of the assistants in the pathological or chemistry laboratory, an unqualified man, who had done some extremely valuable *x*-ray work during the South African war, and really I was astonished when I came here to see how good some of the work could be, notwithstanding the adverse conditions.

But as time went on and *x*-ray work was recognized as being of extreme importance as an aid to diagnosis, and the application of *x* rays as a necessary therapeutic measure in certain cases, one hospital after another saw the advisability of having a medically qualified radiographer, till now, even in the smaller hospitals, it is a medical man who is responsible for the department. In many cases the unqualified man took excellent skiagrams, but, from lack of medical training and insight, was unable altogether to appreciate what it was that was wanted by the staff, or to draw sound conclusions from the appearances shown in the plates.

Now in establishing an *x*-ray department it is first necessary to know what is the nature of the work that is required of you; secondly, what space are you going to be given to carry it out in; thirdly, what sum of money you will be allowed to spend in the outfit; and, fourthly, what assistance and backing are the hospital authorities inclined to give to the department. Well, it seems to me that, first and foremost, it is important that the department shall be able promptly and adequately to deal with the requirements from the surgical side of the hospital, and I will take these requirements in the order of their urgency.

In the first place the casualty department brings all manner of fractures, dislocations, and foreign bodies for immediate attention. Of course, a large proportion of these can be kept an hour or two till the radiographer's regular hour of attendance, but a certain number must be seen at once, and it is therefore important that the apparatus anyhow shall be available at any hour of the day or night, and also that the radiographer shall be available at any time, in case of great urgency. The *x*-ray department is especially useful to the casualty department in cases of small foreign bodies, such as needles in fingers and hand, etc., and doubtful fractures and so forth, and it is by rapid screen examinations of such cases that the house-surgeon is enabled to decide whether to admit such cases into the wards or whether to give them one treatment and let them go. I remember one case while I was visiting the *x*-ray department of one of our largest London hospitals, where I saw the radiographer emerge from the dark room with a dripping

photographic plate in his hand, saying, "Hi, don't let that man go." It was a case where rapid screen examination of a hip joint had not shown a fracture, but a plate taken as a precaution had shown an impacted fracture of the neck of the femur, and the patient was calmly walking off on his fractured limb.

Next come the surgical cases from the wards, fractures of the lower extremities in various stages of repair for examination and re-examination, diseases of bones, and various surgical morbid conditions. These can very well come during the radiographer's hours of attendance, and there are always a number of them awaiting his arrival.

Then the surgeons to the special departments send cases and generally find it convenient to be present themselves at the *x*-ray examination.

Next come the requirements from the medical wards. These latter send a relatively small proportion of cases as compared with the surgical wards, but medical cases are generally more obscure and more difficult than surgical cases and require much more prolonged and careful examination. Screen examination is a very essential thing for medical cases as a rule. A sample of medical cases would be the examination of the extent of the stomach by means of bismuth, first at the time of its administration, and then again several times at various intervals to find out how quickly and completely the stomach empties itself and also the rate of progress through the intestines. Chests, too, have to be screened and photographed for examination of heart, presence or absence of aneurysm, and condition of lungs, nature of tumours in the chest, and so forth.

You will see by the foregoing list that an *x*-ray department needs a pretty complete and convenient set of apparatus and an efficient staff of workers for diagnostic work alone. And in addition to that, it is necessary to provide for every sort of *x*-ray and electrical treatment, and it is this work that fills in the time and employs the staff of an *x*-ray department at such times as they are not engaged in diagnostic work. The majority of this work is sent by the skin department. There is hardly any known skin condition that is not treated electrically nowadays, while a great many patients also are sent from all departments, in-patient and out-patient, medical and surgical, for all forms of treatment from rodent ulcer to hysteria.

At St. George's Hospital the importance of providing for adequate electrical treatment of morbid skin condition was urged upon the hospital authorities by the physician to the skin department, Dr. Wilfrid Fox, and it is largely due to his representations that St. George's now possesses such a well-equipped electrical and *x*-ray outfit. The original design and equipment of the department was thought out by him and myself together, and the system at St. George's is that the skin physician treats such of his own cases as need electrical treatment in the *x*-ray department, and the radiographer treats all other cases that come for treatment.

The authorities of the hospital, having decided that a well-equipped and up-to-date *x*-ray department was necessary, went into the matter in a very thorough manner and put aside a small ward for the purpose, and I think that those of you who are in charge of beds in hospitals will realize that it was with a pang that the physician concerned agreed to such a self-denying ordinance, and Dr. Fox and I were given to understand that so long as our specification was not faddy or extravagant the authorities were prepared to support us in a generous spirit, as they wished the department to be thoroughly efficient.

The ward, which contained twelve beds, is situated on the ground floor, and is therefore convenient of access from all parts of the hospital. Casual cases can be run into it at a moment's notice, and members of the staff and students can come in and see cases and plates with the least possible expenditure of time. It is about 50 ft. long by 23 ft. 6 in. wide, and it had an annex containing kitchen, bathroom, and what are called usual offices.

Fig. 1 is a tracing of it as it was before conversion. You will see that the main door leading from the corridor is at one end of the long way of the ward, and that the opposite end of the ward had a portion partitioned off into two rooms—a sister's room and a clinical room.

From Fig. 2 it will be gathered that the two rooms at the end have been retained but lengthened. They now form two separate *x*-ray rooms, which can be absolutely darkened at will, and each of them is fitted with a complete *x*-ray installation. These two rooms are used almost exclusively for screening patients and taking skiagrams. One of them is fitted with an apparatus that enables me in suitable cases to take skiagrams in a fraction of a second—a very useful possibility for children and for heart and lung cases. The *x*-ray diagnosis rooms are necessary for quick work, so that while a patient is being prepared in one room, or is dressing up after examination, another patient can be simultaneously examined in the other room.

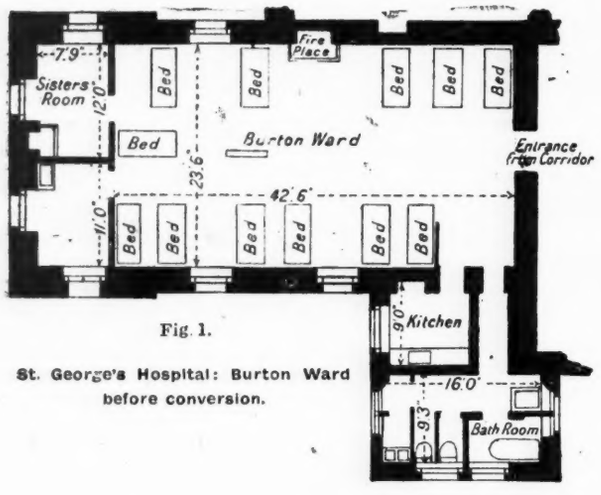

Fig. 1.

St. George's Hospital: Burton Ward before conversion.

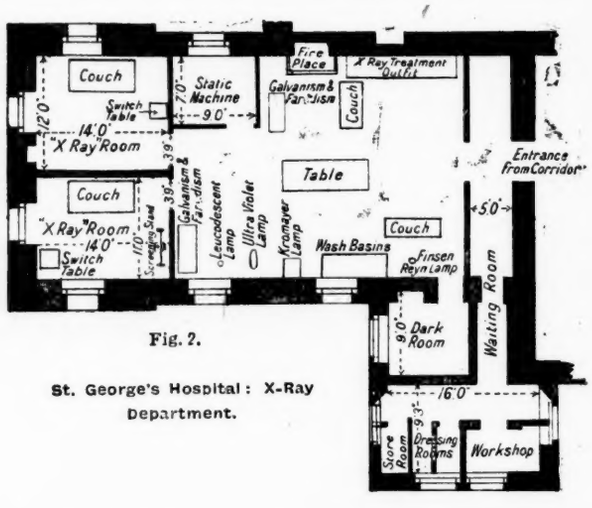

Fig. 2.

St. George's Hospital: X-Ray Department.

The only other distinct darkenable room that has been arranged is a small one on the right-hand side, just beyond the fireplace. This contains a powerful static machine that is continually in use for *x*-ray treatment. It was decided not to make any other definite partition, but to depend upon portable screens to isolate patients from each other in the main ward; and this arrangement, I may say, has been found to be most convenient, and it is possible at a glance to see what is going on in any part of the ward at any of the machines.

Accordingly, the remaining apparatus has been arranged at convenient places around the ward. In the left-hand corner facing the door is a so-called "Leucodescent" lamp, which is simply a single bulb incandescent lamp of enormous candle power burning about 12 ampères of current at 100 volts, arranged in a reflector on a wall bracket provided with counter-weights and all possible adjustments.

In the middle of the left-hand wall beneath a window is fixed a washing arrangement with taps and so forth, having on its far side a Kromayer lamp and on its near

side a Finsen-Reyn lamp. This arrangement is convenient because both these lamps require water circulation while in operation. You are probably all familiar with the Finsen-Reyn lamp, which is extensively used for lupus and other conditions of the skin. The Kromayer lamp is used for the same purposes, but consists of a mercury vapour lamp working in a quartz V-shaped tube. It gives out intense ultra-violet radiation, and will produce a reaction similar to that of the Finsen lamp, only in from three to five minutes, as compared with from half to one hour, but it is still a question as to whether its influence penetrates to such a depth as the Finsen.

On this side of the room there is also a Uviol mercury vapour lamp, which also gives out ultra-violet light, and is much used for alopecia areata. On the right-hand wall, as you enter the ward, is arranged another complete *x* ray outfit, with a Sabouraud stand, and this is used exclusively for therapeutic purposes. In addition to these apparatus there are two trolleys fitted up with galvanization, faradization, sinusoidal current, cautery, and so forth, and there is also a high-frequency outfit in one of the *x*-ray rooms.

These various apparatus are supplied partly by 200-volt continuous current from the main and partly from a transformer in the basements, which converts it to 100 volt continuous. The original kitchen has been converted into a dark-room for development and other photographic processes, and the other offices into dressing-rooms and workshop.

So much for the equipment; now for the staff. This consists of the physician to the skin department, who is responsible for the treatment of his own cases; the senior radiographer, that is myself; a Sister, with one or more nurses under her, according to the amount of work at the time being; and a skilled electrical mechanic.

In an *x* ray and electro-therapeutical department it is of extreme importance to keep careful and accurate records of every case and plate taken, and also to keep some check on the indiscriminate use of the department. For this reason every case that is brought to the department has to be accompanied by a requirement form duly filled up and signed by, or anyhow for, a member of the staff of the hospital. The only exceptions to this rule are trivial casual cases that only need a short screen examination. These are brought by house-surgeons, who often screen them themselves in the presence of either the Sister or the mechanic. Every case, without exception, is entered in the *x*-ray register at the time of the examination, with particulars—namely, date, name, age, name of physician or surgeon, ward, an exact statement of what is required, a short note of history of case where it is pertinent, and anything that may be observed at the time of the examination, together with technical notes, such as size of plates used, position on patient's body, length of exposure, and so forth. All plates are developed the same day, and a full report sent the next day, with the plate, up to the ward, or to the out-patient department.

In cases of urgency the plates are developed on the spot. Similarly with cases for treatment. Particular notes and requirements are entered in a register, and directions for treatment, and every treatment, or group of treatments, are initialled by the radiographer, who thereby assumes the responsibility. Where required, prints are taken from plates and included in the patient's notes. The plates are afterwards collected from the wards, and all that have anything more than an ephemeral interest are carefully stored under year and number, and in this way back plates can be referred to at any time.

It may be of interest to describe a day's routine in the *x*-ray department. This is opened by the Sister in charge and the mechanic at 9 a.m., and immediately treatment cases begin to arrive, and an occassional screen case or two from the casualty department, any case other than a trivial one being kept for the radiographer. At about 1.15 the radiographer attends, his long days being nominally Tuesdays, Thursdays, and Saturdays, and those of the skin physician being Mondays, Wednesdays, and Fridays. In practice Monday is always a long day, with plenty of work to do, and often he has plenty of work every day of the week. The out-patient physicians and surgeons arrive at 1 o'clock, and cases begin to come up from out-patients at once. The cases from the wards, for which requirements are generally sent in the course of the morning, are now sent for, and everybody becomes very busy. Generally, one or more members of the staff come in to examine cases in the course of the afternoon. In the intervals yesterday's plates are examined and reports on them entered in the book, and treatment cases seen and treatments prescribed. Wednesdays and Fridays are often days of exceptional activity, because though nominally on those days the skin department has first claim on the electro-therapeutical, still there is often a considerable amount of work for the radiographer to do, and perhaps every apparatus in the ward may be in use simultaneously. After the departure of the radiographer there is more treatment work for Sister and nurse and development for the mechanic to do, and there is also a good deal of book work to be done by the Sister, such as copying the book reports on forms to send up to the wards, indexing, entering particulars of treatments, and so forth. Indeed, the keeping of careful and accurate records seems to me to be almost as important as doing good technical and expert work.

In conclusion, I may say that two points I have always kept in mind as necessary to make the *x*-ray diagnosis side of my work of value to the hospital are, first, to be very prompt in furnishing the necessary plates and reports; and, secondly, to criticize every plate severely, and not be satisfied unless it shows the condition so clearly that it is decipherable by anybody who possesses a pair of eyes. A word as to the precautions taken to protect the staff of the *x*-ray department from the deleterious effects of *x* rays may not be out of place. In the first place all tubes used are enclosed in an *x*-ray proof box during use. In making screen examinations the operator's hands are covered with *x*-ray proof gloves and his eyes with *x*-ray proof spectacles; the screens are covered with lead glass and furnished with metal finger-guards, and, generally speaking, he is careful to be as far away as possible from the tubes while in action.

THE NORMAL AND PATHOLOGICAL STOMACH AS SEEN BY THE X RAYS.

By Alfred E. Barclay, M.A., B.C., M.R.C.S., L.R.C.P.,

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One is so frequently asked for a radiograph of the stomach that I would like to say at the commencement that in my experience I have never come across a single case in which an *x*-ray picture by itself could give a diagnosis.

The clinical diagnosis of gastric conditions is notoriously inefficient, and it is hardly likely that the mere shadow of the stomach contents should give a diagnosis straight away.

Radiographs are useful for demonstration purposes and they show more detail than one can observe on the screen and hence they are useful; but I wish strongly to emphasize the fact that a radiograph is a record of the picture at one given moment only, whereas the diagnosis is made, and can only be made, by a series of patient observations made at intervals. Cinematographic radiography would certainly be more ideal than screen work, but the cost must necessarily be prohibitive for practical purposes.

The pictures seen in the upright and the horizontal position differ very considerably, and in so complex a subject as this, I have deemed it advisable for the sake of clearness, to omit reference to examinations conducted with the patient lying down, since such examinations yield infinitely less information than those conducted with the patient standing up, and I wish to give you a paper as clear and as uncomplicated as is within my power.

The bismuth meal consists of either the carbonate or oxychloride, thoroughly mixed up with bread and milk, or porridge, and so far as possible it should always be of the same consistency, but apart from the consistency it matters not what the excipient may be, provided that the

bismuth does not separate out from it. Also the food should be made as *palatable* as possible. The quantity taken by the patient naturally varies, but a satisfactory examination cannot be made with less than 4 oz. of the mixture, which will usually contain 1 oz. of bismuth.

The routine method of examination is first a preliminary glance at the abdomen to note the presence or absence of air in the stomach, and also the position of the diaphragm, which should be on the level of the junction of the sternum and ensiform cartilage, after which the patient's mouth is filled with the food, and he is turned into the semi-lateral position in order that the shadow may be seen as it passes through the lowest part of the oesophagus and through the cardiac orifice. When the food has passed this point, and during the rest of the examination, he stands with his abdomen against the screen. Observations are made while the food passes from the upper to the lower part of the stomach, which may be a question of seconds or of minutes. Further observations are made from time to time till the stomach is empty. This is the routine method, and naturally the examination is varied according to the requirements of the case. Many other procedures have been adopted, such as inflating the stomach with CO_2, injecting air into the large intestine in order to show up the greater curvature more clearly, making the patient swallow a mixture of bismuth and lycopodium, cachet of bismuth in goldbeater's skin, etc.

It must be understood that, whatever method we use, the bismuth will outline the stomach only in so far as it fills it; consequently, where the tone is good and the organ contracts upon its contents, the bismuth shadow represents the true shape of the cavity, except in the upper part, which is naturally filled with air, showing as a light area beneath the left dome of the diaphragm; but if the tone is defective all the food falls to the lowest part, and it is only this portion of the stomach that is outlined.

As I have already said, it is essential to have a clear idea of the normal stomach as shown by the *x* rays, and it is surprising to find how completely the pictures differ from the accepted idea.

In the first place, the stomach is placed almost entirely to the left of the middle line, and it is a tubular organ roughly J-shaped. The pylorus is about ½ in. above the lowest point, which is slightly above the level of the umbilicus and ½ in. to the right of the middle line.

We must get rid of the idea that the stomach is a cast-iron retort; like the rest of the alimentary canal, it is a muscular tube, especially adapted for the reception and storage of large quantities at a time, the fundus being a trap above the level of the cardiac orifice for the reception of swallowed air and the gases formed during digestion, and its shape may be altered by even slight forces, either within or without. One is inclined to state that there is no definite normal picture of the stomach any more than there is a definite size and shape for a penny india-rubber balloon.

The increased capacity for food is obtained by lateral expansion of the tube, which should hold its contents up against the action of gravity at a fixed level, approximately the level of the cardiac orifice. The tonic action of the gastric muscle is responsible for this maintenance of the fluid level in the upright position.

The lowest border does not move with respiration, and compensation for diaphragmatic movement is taken up by the stomach walls. The stomach contents are not churned up, but take up their position according to their specific gravities; consequently air always occupies the fundus, and shows as a translucent area beneath the left cupola of the diaphragm. If the stomach is empty the air appears as an oval or as a balloon-shaped shadow, narrowing down towards its lowest border, which is convex downwards; whilst if there is a quantity of food in the stomach, this shadow is an arc of a circle, the lower border being a straight line which can be demonstrated as fluid by watching the ripples on its surface on shaking the patient.

There is almost invariably some air in the fundus, but apart from this the walls of the empty stomach are in contact. It is a potential space. Into this space the bismuth food passes, and the weight of a single mouthful may not be sufficient to canalize the tube for a time; hence it stays in the upper part, just below the air, but as more food is given the shadow is seen passing downwards and slightly to the left for 2 in., and then straight downwards to the lowest point. After three or four mouthfuls have been swallowed the shape of the shadow should be more or less like the letter J, and as more food is given the increased capacity is obtained by the lateral expansion of the shadow, and not by any appreciable drop in the position of the lowest border, or raising of the level of the shadow.

If the stomach already contains food the shadow passes from the cardiac orifice in thick "blobs," which drop through the other foods by reason of their greater weight. The rate at which they drop depends on the relative specific gravities.

The stomach is not a fixed organ, and it is easily displaced by even slight forces. For instance, if the splenic flexure is distended with gas, the stomach is displaced to the right; or if the patient's abdomen is pressed upon, the lowest border may be displaced upwards by two inches or more.

Peristaltic waves occur at the rate of about three a minute, and several may be present at the same time. It is only in the last 2 in. or 3 in. that peristalsis is seen on the lesser curvature, and towards the pylorus the rings of contraction segment the bismuth shadow if peristalsis is active, but *there is no physiological division of the gastric cavity.*

The rate at which the food leaves the stomach varies within very wide limits, even in health, and is much influenced by the character of the food. A bismuth meal should have left the stomach within five hours.

It must be remembered that this is the description of the normal stomach, which is by no means always found even in persons who have never suffered from any gastric trouble. It is a fact that the stomach may be very far from normal in tone, and yet fulfil its functions perfectly.

Atony of the Stomach: "Dilatation."

Where the tone of the stomach is perfect the tubular shape of the organ should be maintained until the stomach is empty, but perfect tone is not the rule—in town dwellers at any rate.

Atony is the failure of the muscle to withstand the action of gravity upon the contents. In the mildest degrees of atony the food is held up for a minute and then gradually gravitates to the lowest part, and there is always some evidence of the tubular formation remaining even after a prolonged period. That the bismuth shadow only outlines the lowest part of the stomach after a time does not necessarily indicate loss of tone; for it must be remembered that the stomach may contain other food, and will itself be excreting juice, which, being lighter than the bismuth food, will consequently rise above it, and hence, although the tubular form may be maintained, yet the upper part of the tube will throw no shadow, simply because it contains none of the bismuth mixture.

The picture of a really atonic stomach as seen upon the screen is that the bismuth meal, instead of being held up, in tubular form, sinks at once to the lowest point, where it lies as in a sac. A whole bismuth meal quickly finds its level in the lowest part, forming a more or less crescentic shadow low down in the abdomen, and in extreme cases even on a level with the pubes, but even in these it is usual to find that peristalsis is quite easily seen.

In such cases it is often difficult to persuade the patient to take more than a very small quantity of the bismuth food, but if he can be prevailed upon to do so, it is found that the increased capacity is obtained, not by a widening out of the shadow, but by an increase in the vertical depth; in other words, the stomach does not contract upon its contents, but appears to remain inert.

The manner in which the food enters the stomach suggests that the walls are in contact, and frequently the bismuth descends in a thick stream to the junction of the middle and the upper third, from which point it drops in thick "blobs" to the lowest point, suggesting that there is already some food retained in the lower part of the stomach which keeps the walls apart, and through which the bismuth drops.

The lowest border of the stomach is well below the umbilicus in atony, but this is no proof that the stomach is atonic, for the whole stomach may be displaced downwards, as in visceroptosis—hence the importance of noting the level of the diaphragm.

One frequently hears people say they feel a sinking of the stomach; and this is actually a fact—the sensation is caused by relaxation of the tone, which actually allows the lower border to sink. The tone of the muscle may vary in quite a short time, and is influenced by the patient's appreciation or disgust with food, and by various emotions. For instance, I have seen the lowest border drop an inch when the patient was made to smell asafoetida, and the same phenomenon has always been noted when patients have complained of nausea, while on the other hand the tone returns when the patient is actually about to vomit, and the whole organ contracts up, hence you will see the importance of making food as little unpalatable as possible. It is also a remarkable fact that patients who enjoy their food, and who habitually overeat, never show any signs of atony, while in those who eat very little and who do not relish their food, atony is nearly always present. Whether this is *post* or *propter* I do not know, but these observations strongly suggest that the tone of the stomach is very much under the influence of the mind, and reiterates the old precept that man should take his food with thought.

Frequently at operations the stomach which has appeared at the *x*-ray examination to be quite normal is found as a large flaccid sac, and vice versa. This discrepancy is accounted for by the fact that nausea and disgust will cause temporary diminution in tonic action—that is, the stomach will become a large atonic sac; whereas in retching it is contracted up. Anaesthetics paralyse the involuntary muscle of the stomach, consequently the condition found at the operation is that in which the muscle happened to be when the anaesthetic acted upon it.

In a thinned-out, atonic stomach it is only natural that peristalsis should be weaker than in the normal stomach; but, even in cases where the lowest point had been on the level with the pubes, peristalsis was quite well marked.

On the other hand, one has seen absence of peristalsis in stomachs in which the tone has been perfect, and these cases have all been found at operation to have extensive ulceration or malignant disease involving some portion of the lower third of the lesser curvature; hence it is proved that the two muscular functions of peristalsis and tonic action are independent of each other, and it is suggested also that peristalsis is under the reflex control of nerves passing from the pylorus along the lesser curvature.

I always regard absence of peristalsis, especially when it cannot be evoked by abdominal massage, as suspicious of extensive disease near the pylorus, and always verify the observation by further examinations at subsequent dates.

The study of peristalsis is one which I thought would yield a great deal of information, and possibly it may yet do so with cinematographic records, but in my experience peristalsis is extremely variable from time to time, and its force and rhythm may be altered by minute changes in the character of the stomach contents, or the patient's feelings. For instance, in one patient who suffered from duodenal ulcer very marked peristalsis was observed, some of the waves being excessive and accompanied by colicky pain; on giving the patient some sodium bicarbonate in water, there was an instant relief of this pain and an absolute cessation of all peristalsis.

Excessive peristalsis points to some abnormality near the pylorus; but the stomach is full of so many spasmodic conditions, and is altogether such a nervous organ, that I do not lay much stress upon this sign unless it is exceedingly violent.

Pyloric Obstruction.

Chronic pyloric obstruction has been noted in many cases. It gives rise to retention of food, and if the tone of the stomach is good we see a broad fluid line below the air, which ripples and splashes when the patient is shaken, even though the patient has been starved for several hours previously.

On giving bismuth food a stream of dense shadows is seen falling from the cardiac orifice down to the lowest part of the stomach. Naturally only the lower border is outlined, and on giving more food it is noted that the shadow does not broaden out from side to side, but tends to suggest that the bismuth is only outlining the lower part of the vertical column of the stomach contents. The peristaltic waves are frequently excessive.

Such is the picture when the tone is good; but when the tone is absent, and all the retained food has sunk to the lower part of the stomach, there is nothing to indicate its presence, and the picture is simply that of a dilated stomach in which peristalsis is more violent than one would expect in a thinned-out organ.

The proof of pyloric obstruction is that the stomach still contains some of the bismuth meal longer than five hours, in spite of the presence of good peristalsis, consequently observations must be made from time to time to see when the food leaves the stomach. If it is empty in ten hours, the condition is such that the patient can probably lead a comfortable life with careful dieting, but if there is still food in the stomach after twenty-four hours, as I have noted in forty-two cases, the condition calls for surgical interference. I have yet to come across a case in which the food has been retained after twenty-four hours in which motor insufficiency was the cause of the retention of the food. Operation has always revealed marked obstruction.

Very frequent observations are not necessary, since we can learn from the position of the bismuth in the large intestine approximately when the food left the stomach, for it is noted, to quote Hertz's figures, that food is seen in the caecum in four and a half hours, at the hepatic flexure in six and a half hours, etc. In hospital practice I usually keep patients under observation during the first hour and then do not see them until twenty-four hours later.

Acute pyloric obstruction gives rise to excessive peristalsis, but the obstruction may be spasmodic, and no diagnosis should bemade on this sign alone; but occasionally in early new growths of the pylorus occurring in an otherwise healthy stomach, the peristalsis may be extreme, and coupled with forcible contractions of the stomach as a whole, so that it appears to writhe in its attempts to pull the pylorus back over the food. Such a picture makes the diagnosis of acute pyloric obstruction certain, whether food is retained or not.

Spasmodic Conditions and Gastric Ulcer.

As I have already said, the stomach is an extremely sensitive muscular organ, and it is the site of many spasmodic conditions of which as yet we do not know the significance. These spasmodic contractions enter into all lesions of the alimentary canal and complicate the whole diagnosis. Doubtless many are purely functional, others are reflex, but certainly gastric ulcer is one of the causes of these local spasmodic contractions, and sometimes the site of an ulcer is definitely indicated when the clinical evidence also points to this diagnosis, but without the clinical evidence, even a provisional diagnosis of gastric ulcer should not be made from the presence of spasmodic conditions. Those most frequently met with are situated about the junction of the middle and upper third, and the picture given by the bismuth meal is that the shadow descends to this point and forms up in a cone shape above it as more food is given.

Comparatively suddenly the spasm may relax and the bismuth food passes on into the lower portion, often in a thick stream, giving a bilocular appearance for a time.

When the bismuth food is held up in the upper portion of the stomach, it is always a good plan to get someone to rub the abdomen, and this very frequently relaxes the spasm so that almost at once the contents pass down. When the tone of the whole organ is good, the resultant shadow is that of a normal stomach with possibly a small indentation to mark where the food had been held up, but if the tone is defective, as it usually is in these cases, the contents drop into the lower part, possibly leaving some traces at the point where the obstruction was noted. Further, abdominal massage usually causes the whole shadow to gravitate to the lowest part, but if traces are observed for a considerable length of time in spite of massage, it is almost certain that there is a definite ulcera-

tion or cicatrization at this point, giving rise to the spasm. Such are the pictures of spasm in the middle portion of stomachs of normal and deficient tone, and these may be due to an ulcer, but apart from the evidences of traces left about the ulcer after the upper part of the stomach is empty, the diagnosis is one of a spasmodic condition which may or may not be due to ulceration.

Hour-glass Stomach.

Bilocular conditions of the stomach may be spasmodic in character, and it is not easy in many cases to distinguish between a functional and an organic contraction. The bismuth is held up in the upper sac, and it may be noted that retained food is present, and it is always suggestive of a bilocular condition if the lowest point seen does not reach to near the level of the umbilicus without showing some indication of turning to the right, as if towards the pylorus. On watching the shadow carefully it is generally seen that some portion of it is passing on, either in drops or as a thin pencil, and falling into the lower sac. If no food is seen passing on, the patient should be persuaded to take some more of the bismuth meal, and this is often sufficient to increase the intragastric pressure so that the passage will be canalized.

Hour-glass stomach due to large active ulcer and cicatrix.

If, on rubbing the patient's abdomen, it is found that the greater part of the shadow has descended into the lower sac, the condition is almost certainly spasmodic, but if rubbing the patient's abdomen makes little or no difference in the rate at which food leaves the upper sac, a true organic hour-glass condition is almost certainly present; and on careful examination of the upper sac, peristalsis can be found on the greater curvature starting almost under the diaphragm—that is to say, much higher up than usual. The presence of peristalsis in the upper sac is one of the chief diagnostic points between a true organic and a spasmodic obstruction, but it must be remembered that there will be a spasmodic element in all organic lesions.

Hour glass stomach due to ulcer and puckering.

In the lower sac the food may show a variety of pictures, but usually the shadow is well below the umbilicus, and atony is present. Peristalsis is well marked, and it is very frequently found that pyloric obstruction is also present, and that the greater part of the bismuth meal is still in the lower sac after 24 hours.

Out of 17 cases, giving the picture of hour-glass stomach, 10 have been true organic, 4 partly organic with some ulceration causing spasm, while 3 have been purely functional. Of these functional cases, 2 were entirely unrelieved by gastro-jejunostomy, and the hour-glass appearance was very definite after the operation.

Carcinoma of the Stomach.

New growths in the abdomen throw no shadows which can be distinguished from the general abdominal opacity; they can, however, often be demonstrated by reason of displacements of viscera, irregularities caused by the inroads or the growth in the stomach, and by the obstruction of the passage of the food, all of which may be shown by giving the patient a bismuth meal. If the pylorus is involved, obstruction may be noted, but this form of obstruction cannot be distinguished from pyloric obstruction due to other causes.

Apart from pyloric obstruction, the diagnosis of carcinoma depends upon the irregularities caused by the inroads of the growth, which I have made out in 23 cases. The irregularities observed may be quite small, like the outline of a piece of coral, or there may be marked inroads of the growth which displace the bismuth and consequently give rise to marked irregularities that suggest peristaltic waves at first sight; but, on further observation, it is noticed that these are permanent, and that peristaltic waves (if present) sweep up to these notches, are lost to sight and reappear on the further side of them.

Growths involving the posterior wall may invade the stomach so that the bismuth is displaced and a clear space is seen in the midst of the shadow, which in two cases I have seen appeared and disappeared as peristalsis swept past.

In 5 cases of undoubted carcinoma *in the abdomen* the bismuth examination failed to show any evidence of the growth.

Aërophagy (Air-swallowing).

Air-swallowing is a not uncommon condition, and one which may give rise to severe gastric symptoms. On examining the patient it is always found that the stomach contains air which appears to be greater in quantity than usual. (This is suggestive that there is a neurotic element in the case.) On giving bismuth food the outline of the stomach may be perfectly normal or it may suggest an atonic condition, but it is always noticed that as the patient swallows his food a certain amount of air enters the stomach with each mouthful, and the air shadow gradually increases and may extend as much as half-way down the stomach, so that the cardiac portion is dilated like a great bubble, occupying the whole of the left hypochondriac region, and even displacing the diaphragm upwards. Such patients swallow more air with liquids than they do with solid or semisolid food, so that any case where this condition is suspected should be tested with a glass of water. Violent and persistent eructations may take place, but it is noticed that the air shadow, instead of becoming smaller, remains the same or even becomes greater in extent. In following up these cases I have noticed that 2 out of 7 marked cases have stated in their replies that they have been cured by the examination.

Duodenal Ulcer.

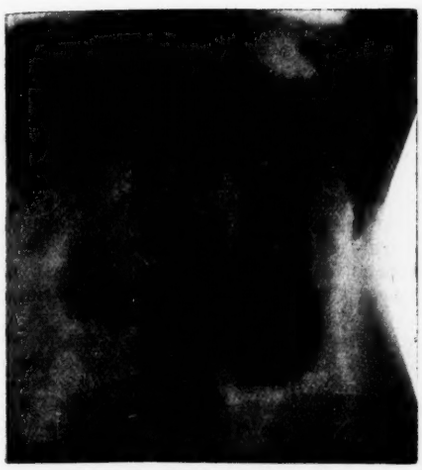
It may be noticed in this condition that just beyond the pylorus there is a separate shadow which is persistent, and is quite unaffected by the peristalsis of the stomach, therefore the shadow is in the duodenum. In conjunction with this we usually have the picture of a perfectly healthy stomach in which peristalsis is more violent than usual, and a feature I have noticed in many cases is that the pylorus opens more frequently, and the gastric contents are passed on more rapidly than usual, so that the stomach is sometimes empty in as short a time as half an hour, and this rapid emptying of the stomach may account for the hunger pain, on which so much has been written lately.

The picture of a normal stomach exhibiting excessive peristalsis, and passing the food on very rapidly, is always suggestive of trouble in or about the duodenum; but the presence of a separate bolus in the duodenum is accidental, and depends upon the presence of cicatrices or spasmodic conditions causing pockets on the inferior surface. The whole picture is very suggestive, but it is not diagnostic, since it may be due to puckering of the duodenum from other causes, such as carcinoma.

To sum up, the simple *x*-ray method of examination with the bismuth meal can yield a great deal of information as to the state of the stomach. The method is not easy, in that it requires a great deal of experience and a thorough understanding of the normal.

That the method is of use is very evident from the fact that already this year over 100 cases have been sent down for examination at the Manchester Royal Infirmary.

It is useless to try to give figures as to correct and incorrect diagnosis, but provided one obtains a clear view of the stomach I feel that one should be able to get near to a correct diagnosis in nearly every case. Hour-glass stomach should always be diagnosed. Carcinoma generally gives some hint as to its presence, or at any rate as to the need of operative interference, owing to pyloric obstruction, sometimes before it is diagnosed clinically. Pyloric obstructions should always be made out if they are well marked, while the examination frequently reveals a suggestion of the presence of gastric ulcer and cicatrices.



The appearance in duodenal ulcer.

My purpose is fulfilled if I have given you an idea of the utility of this simple method, and for those of you who are using the method I would once again reiterate the fact that the stomach is full of spasmodic trickery.

Further progress, I believe, does not lie so much in the elaboration of the apparatus and the perfection of instantaneous and cinematographic radiography as in the better understanding of what we all can see on the screen.

SOME BONY CHANGES OBSERVED IN A CASE OF CHRONIC X-RAY DERMATITIS.

By REGINALD MORTON, M.D.Toronto, F.R.C.S Ed.,
Officer in Charge of *X*-ray Department, West London Hospital; Lecturer on Radiology, West London Post-graduate College.

My object in coming before you to-day is to bring to your notice certain changes that have been observed in the bone in the progress of a case of chronic *x*-ray dermatitis. The case is of more than ordinary interest, since the changes, so far as they can be seen by means of the *x* ray, have been observed for so long a time, and also because with our improved knowledge and methods of protection the condition is one that is certain to have an existence only in medical history perhaps within the lifetime of many of us here present.

The patient was an assistant in the *x*-ray department of the London Hospital, and one of the first regular workers in this branch of science. Like many others, his hands were exposed to the *x* rays very freely, and the first attack of acute dermatitis came on in January, 1900, since which time it may be said that he has never been quite free from dermatitis. Chronic ulceration had set in about the end of the same year, and in 1902 keratoses began to form, with the usual accompaniment of telangiectatic blotches, tapering of the fingers, and so on.

In June, 1903, began the series of operations that have been done from time to time. At the first the nail of the right middle finger was taken away; a year later four nails and matrices, and the terminal phalanx of the right middle finger were removed. Suppuration continuing from time to time, half of the second phalanx was removed in February, 1906, but as the stump showed little tendency to heal satisfactorily, the rest of it was taken away in the following June. The stump healed over slowly, but more or less satisfactorily.

Beyond some tenderness on pressure and pain at times, this part gave him little trouble for over a year. On November 9th, 1907, while showing some visitors over the *x*-ray department, with the idea of giving a demonstration as to how a screen was used, he placed this hand for a second or two behind the screen and in the path of the rays. He was surprised to notice the changes in the bone which are shown in the first of the series of radiographs that I propose to show you. In making this series every precaution was taken to expose the hand as little as possible, and as the exposures were almost momentary and at considerable intervals any deleterious action they might have would be trifling.

The first radiograph was made on November 9th, 1907 (Fig. 1). Here you will observe that the distal end of the

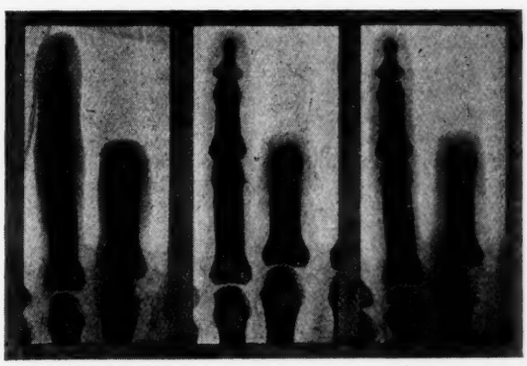


Fig. 1. Fig 2. Fig. 3.

first phalanx is as transparent to the rays as the soft parts surrounding it, and this state extends for about one-third the length of the bone.

In the next picture, taken on December 1st (Fig. 2), three weeks later, the condition has increased in transparency and extent. On December 30th (Fig. 3) still further progress has been made, so that the distal half of the bone is affected. No further radiographs were made for three months, and the next one was made on April 1st, 1908 (Fig. 4). You will see that the invasion of the normal bone structure has continued until quite two-thirds of it

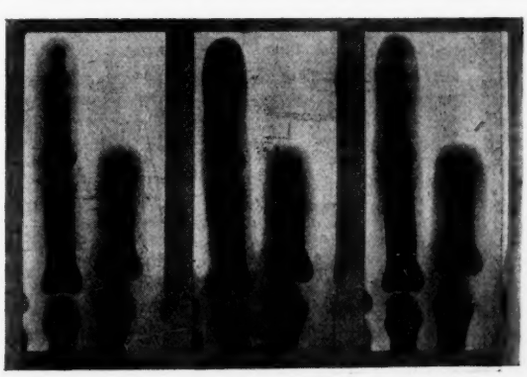


Fig. 4. Fig. 5. Fig. 6.

has been altered in appearance. Concurrently with this, however, the distal end has been getting more opaque in irregular patches, as if Nature were trying to repair the damage. In the next two radiographs (Figs. 5 and 6), taken on May 1st and June 1st respectively, these two processes of destruction and repair are seen to be going on side by side. Only the proximal end of the bone with its articular surface remains of normal structure.

The deposit of lime salts—I hesitate to describe it as new bone—extends up to at least one-half the length of the phalanx, but we can see at this stage a commencing rarefaction of this new material at the tip of the bone, on the side adjoining the other finger.

The first on the next slide was taken on July 1st, 1908 (Fig. 7)—that is, one month later. The slight notch in the new formation has now become a big one, so that half the thickness has been eroded away; it will also be

noticed that the invasion of the normal structure has slowly advanced.

On examination of the next radiograph, made on August 5th, five weeks later (Fig. 8), we see that this notch has been reduced in size, showing that the process of repair has again got the upper hand; and in the radiograph made on September 16th (Fig. 9), the phalanx has been almost restored to what it was before this second rarefactive process set in. The next one, made on October 27th (Fig. 10), shows the last state of affairs practically unaltered, and as the stump was not giving much trouble no further radiographs were made for some time.

Towards the end of the winter, pain and tenderness began to increase, and on March 1st, 1909 (Fig. 11), we found the erosion again in progress, but on the other side

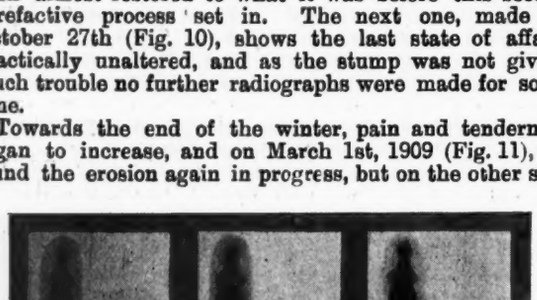


Fig. 7. Fig. 8. Fig. 9.

of the bone, and to such an extent that there seems to be a pathological fracture of the distal end of the phalanx.

The last radiograph I have to show you was made on June 17th, 1909 (Fig. 12), in which the fracture has been repaired after a fashion, but the rarefactive process is again invading the shaft of the bone

It is interesting to notice that all through the case the articular surface and a thin layer of bone immediately adjoining have resisted the destructive action that was going on elsewhere.

The subsequent history of the case has not been favourable, and I understand that the whole of this phalanx was

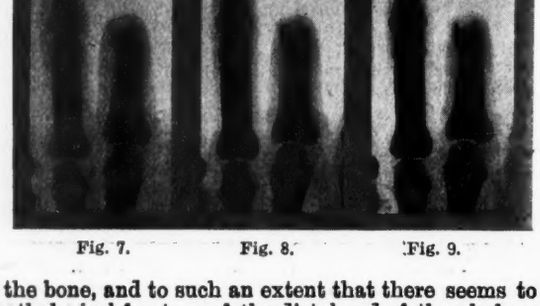


Fig. 10. Fig. 11. Fig. 12.

removed on May 26th of this year. No doubt a report on the gross and microscopic appearances will be forthcoming in due time; it may be of interest to give here a report of the microscopic changes observed in a section made from the terminal phalanx of this same finger, by Professor Leith of the University of Birmingham: "It shows great hypertrophy of the epithelium, great invasion by the epithelium of the deeper tissues, great overgrowth of the cells lining the lymph spaces, reversion of bone corpuscles to periosteal-like cells, and absorption of bone."

While the mention of the invasion of the epithelium and the absorption of bone are both significant, this does not help us very much as to what is the cause of the rarefaction. It must be remembered, however, that this report refers to the terminal phalanx, and there is no evidence to show that any changes such as I have shown you ever took place in that phalanx.

Further, we are safe in assuming that there were no rarefactive changes going on in the first phalanx at the time of the last operation in June, 1906. It was not until November, 1907, that any change was noticed, and then only through an accidental circumstance. The patient's hands were never exposed to the rays except at very long intervals, and then for never more than a second or two.

I regret very much that I have not had an opportunity of seeing this first phalanx after removal, and also of seeing microscopic sections, but I understand that Dr. Gilbert Scott, of the London Hospital, will be able to enlighten us to some extent.

I am sure it will be agreed that the condition shows many points of great interest, and that these cases should be recorded as completely as possible.

DISCUSSION.

Dr. Gilbert Scott (London Hospital) said that the microscopical sections of the amputated stump in the case Dr. Morton had brought forward showed the bones eroded by squamous epithelioma, the curious point being noted that there was no involvement of the skin. The disease was apparently entirely confined to the bone, which seemed to offer less resistance to its progress. Whether all the bony changes seen in the skiagrams from start to finish might be entirely due to the involvement of the bone by this disease from the very commencement, though not diagnosed as such, he could not say. If these bony changes were due entirely to the action of the x rays, it seemed natural to ask why all the bones of the hand were not equally affected. The disease started in the terminal phalanx. If the disease were epitheliomatous from the commencement, and spread downwards through the bones rather than through the epithelial tissues, the changes seen in the radiographs were accounted for. But, this being the case, the disease was evidently not of a very malignant type, because from the commencement in 1900 up to the present time it had only affected as far as the metacarpal bone. An interesting feature of the case, as seen in the skiagrams, was that in one of them the bone appeared to be eroded, and in another, taken some months afterwards, the bone had filled up again. Its period of repair coincided with a holiday taken by the sufferer, after which it become eroded on the opposite side, the side that was eroded in the first instance remaining fairly solid.

Mr. J. Hall-Edwards (Birmingham) said that in his own case no alterations in the bones were found which agreed with any cancerous condition or malignant condition at all. The curious part about it was that at the point where the bones eroded there was no sore on the hands at all, and instead of the hand being enlarged, as one generally found it in nearly all the malignant conditions of the bone, the portion of the finger over the most deeply eroded part was actually smaller. Moreover, on examining it with the aid of a very well focussed tube, a sharp image of it was obtained, without the slightest sign of débris in the space. He came to the conclusion that the erosion of the bone was due to secondary nervous changes, and he could only think that the fact of the bone undergoing considerable softening and getting better was an indication that the absorption of bone was secondary to the injury to the nerves themselves. Although he trusted there would now be no more cases of x-ray disease of the bone, the question was one of interest from the point of view of treatment. Otherwise the door seemed to be shut effectively against such serious results in the future.

Dr. James Metcalfe (Bradford) said that the most curious feature of the case was that the fingers showed recuperative power, which certainly indicated that the condition was not that of epithelioma, for there would be no deposit of bony salts in the part if there had been any malignant growth of that character. It was a matter of great interest, and, indeed, of moment, for any one who suffered from a condition of this kind to know that it was possible for recuperative action to take place, and thereby to be able, perhaps, to get rid of the disease without great mutilation. The paper showed that Dr. Morton had devoted a great deal of time to a subject that could bring him no return save in respect of its scientific interest.

Dr. A. Howard Pirie (St. Bartholomew's) said that it was very refreshing to hear Mr. Hall-Edwards say that the door had been closed against further troubles of this sort from the *x* rays, especially when one remembered that the wave of popular fear had now reached its height. In discussing the best methods of protection, a precaution that was not insisted on was the distance from the *x*-ray tube which might be considered safe. He had made a calculation as to the distance it would take a pastille dose to be received three yards from the tube, and he found that the operator would have to sit at that distance for a period of a week all but an hour and a half before the pastille dose was obtained.

Dr. Morton, in reply, said that to himself the point that was most interesting in this case was the consecutive, or even at times simultaneous, action of the processes of destruction and repair. This made it difficult for him to believe that there could be anything epitheliomatous going on inside the bone. It seemed almost inconceivable that there should be, along with this phenomenon, the microscopical changes pointing to epithelioma to which Dr. Gilbert Scott had alluded. It would be easy to branch off from this into the whole question of *x*-ray protection. He considered that the question of the distance from the tube was the most valuable of all. Personally he was fortunate in having escaped any deleterious action, and he attributed his immunity to the fact that, in the early days, he saw the hands of the late Mr. H. W. Cox, who, however, would not believe that the *x* ray was causing his lesions. He (Dr. Morton) was of the contrary opinion, and he simply took the precaution, as far as possible, always to stand behind the plane of the anticathode, and to put a distance of at least two metres between himself and the tube. Of course, when making screen examinations this was not always possible.

THE ADVANTAGES OF X RAYS IN COUNTRY PRACTICE.

By J. B. Simpson, M.A., M.D., C.M.Edin.,
Surgeon, Lawson Memorial Hospital, Golspie.

It seems to me that the advantages in the use of *x* rays in country practice have not been sufficiently appreciated, and I propose to make some commonplace remarks on this subject, confining myself to the diseases and injuries of bones and joints and to the advantages of the use of *x* rays in these conditions.

For the last twenty-three years my lot has been cast in the Highlands of Scotland, and I can therefore speak with

Fig. 1.—Tuberculous abscess of head of tibia.

a certain amount of assurance with regard to the difficulties encountered by the country practitioner. Situated, as he is, far distant from the hearth of the consultant and specialist, whom he can rarely summon to his aid unless his patient belongs to the richer class, he has to learn to depend on his own judgement in the treatment of many difficult cases. Anything which can help towards greater skill in diagnosis and treatment should be eagerly taken advantage of by him. This is my reason for advocating the use of *x* rays in our work.

For many years I felt that fractures, including the more common as well as the rarer varieties, had not received

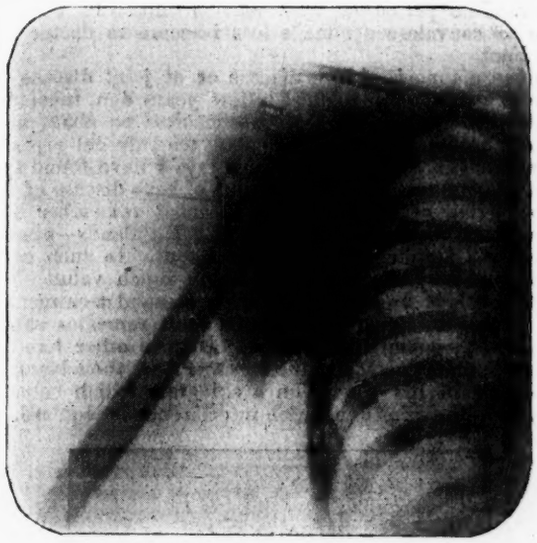


Fig. 2.—Surgical fracture of neck of humerus.

the attention they deserved. We had not a clear idea of the pathology of many of them, and as we possessed no means of proving whether our clinical diagnosis was right or wrong, treatment was apt to be slovenly and unscientific, and the results, more or less, were far from ideal.

By ideal results I do not necessarily mean accurate end-to-end apposition of fractures. In most cases that is impossible, and in many quite unnecessary. The *sine quâ non* should be correction of deformity and restoration of function, the latter being the more important.

The fractures near the ankle joint more especially yielded unsatisfactory results, and will continue to do so until they receive the attention they deserve. In some cases the limb was treated for fracture where none existed, and in other cases the patient struggled about with a fractured fibula diagnosed as a sprain. Injuries in the region of the ankle, knee, and wrist are among the most common in the Highlands, where we have to deal with hillmen, deer-stalkers, gillies, crofters, and fishermen.

Until within the last ten years the country people, who are an exceedingly intelligent class, believed that a doctor was not skilled in the treatment of injured bones or joints, and if treatment consisted in fixing a fracture up for six weeks in a splint and then telling the patient that he was

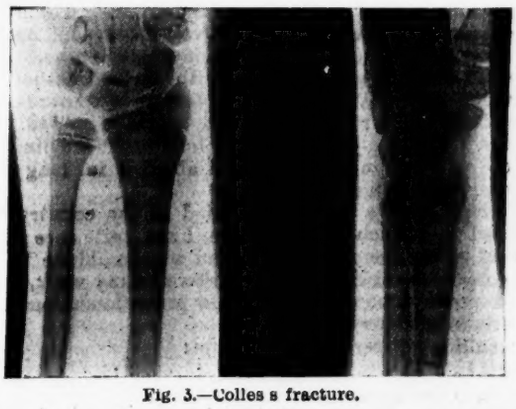


Fig. 3.—Colles s fracture.

cured, I do think their unbelief had some justification. The bonesetter consequently flourished, and his rough and ready methods, the essence of which was free movement of the joints, were considered superior to the doctors' methods because they led to a speedier recovery of the functions of the limb.

The use of *x* rays in practice has been the ruin of the bonesetter, to the advantage not only of the doctor but of the patient. My experience during the last seven years has been that the use of the rays has been of much value in diagnosis, prognosis, and treatment. Bone injuries can be treated with more precision and more assurance and on more rational lines. My experience is that results are better. The period of treatment is shortened and the period of convalescence made less irksome to doctor and to patient.

In the diagnosis of bone disease or of joint disease we were at a disadvantage until a few years ago, inasmuch as the country people seldom consulted us about bone disease unless the limb presented unequivocal signs of mischief. Since I began to use *x* rays I have found that an increasing number of early cases of bone disease of the elbow, wrist, and knee—and you must remember that tuberculous disease is rife in the Highlands—present themselves for diagnosis and treatment. In such cases a skiagram may afford information of much value. The result of this is an opportunity for successful treatment of the disease by constitutional and local remedies rather than by any operative measures. On the other hand, if an operation is necessary, the operator has the advantage of having in his possession a skiagram which helps to determine the extent to which interference is required.

Fig. 4.—Colles's fracture.

The cost of an *x*-ray apparatus suitable for use in the country is not prohibitive. In my own case my experience has been derived from an apparatus which was presented eight years ago to the Lawson Memorial Hospital, Golspie, of which I have the privilege of being the Surgeon. It consists of a Cox 10-in. coil, the old form of Mackenzie Davidson mercury brake, and a 24 volt battery. The tube used has been the ordinary Müller heavy anode tube. With a current of 5 to 7 ampères, and with the anticathode at a distance of 15 to 18 in. from the plate, my exposures have varied from half a minute in the case of a hand, to three minutes for a hip-joint. I have found that a cylinder of sheet lead 7 in. in diameter and about 8 in. long gives better definition in difficult cases.

If every cottage hospital situated in the country were provided with such an apparatus, I am quite sure that a medical practitioner could be found who would be willing to devote sufficient time and attention to *x*-ray work, which would prove a boon to his fellow practitioners and their patients in the surrounding districts.

I would lay stress on three points:

1. That a simple and comparatively inexpensive apparatus can be made to give good results.
2. That good results can only be obtained by thorough acquaintance with the particular apparatus with which one is accustomed to work.
3. That it is essential that the working of such an apparatus should invariably be under the direct supervision of a duly qualified medical man.

[Dr. Simpson concluded his paper by illustrating by means of slides some of the injuries and diseases of the bones which he had met with in country work during the past few years.]

A NEW STAND FOR X-RAY WORK.

By Professor Dr. K. F. Wenckebach,
Groningen, Holland.

Dr. Wenckebach gave a brief demonstration of a new form of *x* ray stand, chiefly for screen work and radiographs, and pointed out that the full advantage of the *x*-ray method of diagnosis was obtained when they had, not merely co-operation between the radiologist and the medical man in charge of the case, but a radiologist who was himself the medical man attending the patient. The new apparatus had the advantage of being in reality a combination of instruments with which many kinds of special work could be done, and also the further advantage that by its means the radiographer could carry out the whole of the work single-handed. The stand was a double-framed arrangement, with accommodation for the patient between the frames. The patient was fixed in sitting or standing position by means of bands and could be placed in any situation desired for radio-examination. The second stand, behind the patient, was capable of being easily pushed forward or pulled backward, and the tube was fixed in its protective box in such a manner that with the aid of a piece of wood it could immediately be centred against the diaphragm. The operator in front of the fluorescent screen was always aware of the exact position of the tube. The simplicity and easy adjustment of the apparatus were such that twelve or fifteen people might be present and see at once what was going on. The apparatus was useful for radiography of the chest, neck, and skull, for stomach work, for the diagnosis of renal calculus, and offered facilities for stereoscopic radiography. The tube and screen could be readjusted when it was necessary to make a screen examination of the larger parts of the body.

DISCUSSION.

Dr. A. E. Barclay (Manchester) said that he used an apparatus similar to the one which had been demonstrated, and his experience with it impelled him to utter a word of warning. After a morning's work with it he found it very tiring, and he came to the conclusion that it was insufficiently protective. After making its protective capacity more complete by the addition of some proof rubber, he experienced a great difference. In his opinion, something further ought to be added to the stand which had been shown.

Mr. Thurstan Holland (Liverpool) also expressed the opinion that all stands of this kind were absolutely inadequate for protection. Personally, he would not like to have a number of students and others to come down day by day, and stand in front of such an apparatus.[1]

Dr. Wenckebach said that he was quite aware that protection could not be made absolute, but in this case it was only the very hardest rays that could come out from the tube, and personally he had never experienced any discomfort. A real danger, it seemed to him, lay in another direction. There was so much lead in the modern *x*-ray room that lead-poisoning was a possibility not to be overlooked.

[1] The makers of the stand in question, Messrs. Siemens Brothers and Co., have since informed us that they supply with most of their screening stands and outfits a second shield, which is lead-lined and has a sliding lead-lined panel, which can be raised or lowered with ease. This shield being very compact it can be used with the operator sitting down as well as in a standing position, and ensures him protection at whatever height or position he requires it.

The twenty-fifth Congress of the Royal Sanitary Institute will be held at Brighton from September 5th to 10th.

The Department of Health of Charleston, South Carolina, has established a Pasteur Institute, which will be under the direction of Dr. J. Mercier Green, health officer of the city, and Dr. G. McF. Mood, meat and milk inspector. Patients may receive treatment either at the laboratory of the medical college or at their homes.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A CASE OF RHUS TOXICODENDRON DERMATITIS.

A SEVERE case of rhus poisoning is, perhaps, sufficiently interesting to warrant my sending a few notes on one which has come under my observation lately.

The victim was a gardener, who came to me last autumn complaining of an itching, burning, erythematous and herpetiform rash, resembling the not uncommon *Primula obconica* rash, to which I attributed it, though the patient did not remember having handled the plant.

Some days later, however, he remembered he had been plucking leaves from a tree which was afterwards recognized as the *Rhus toxicodendron*.

The eruption, beginning on the wrists, soon spread to the eyelids and face. Papules, vesicles, and bullae quickly formed until the whole body was more or less affected. The skin on the hands, forearms, face, neck, and prepuce

RHUS TOXICODENDRON, OR POISON IVY.

became very oedematous, and covered with broken bullae with profuse discharge.

The irritation of the rash was very severe, preventing sleep, and his discomfort was increased by conjunctivitis and tightly-closed eyelids—a condition which lasted for five days.

Calamine and lead lotion were successful in relieving the distress, but it was quite seven weeks from the commencement of the attack before he was able to resume his work.

Crocker, in his *Diseases of the Skin*, states that some people are much more prone to be attacked than others. Evidently this man is one who is very susceptible to it, for, though he pruned the plant with the greatest of care in the spring, he was threatened with another attack this year, which fortunately spread no further than the forearms.

But the curious feature of the case is that, although the patient is so susceptible at present, he could not always have been so, for he has pruned and plucked leaves from the tree with impunity in former seasons.

The illustration is the reproduction of a photograph of the tree for recognition. Although the tree is nearly 20 years old, this is the first time it has been known to poison anyone.

Little Sutton, Chester. H. W. NOTT, M.R.C.S., L.R.C.P.

A CASE OF INCOMPLETE DEVELOPMENT OF THE EXTERNAL AUDITORY MEATUS.

AT the school medical examination of a boy, aged 5, in West Glamorgan, it was found that the right external auditory meatus was only about a quarter of an inch long, and appeared to be lined throughout by normal skin. There was no trace of cerumen, and on palpation with a blunt probe against the skin at the end of the cul-de-sac no bone could be felt. The pinna was normal, but a sessile projection, slightly smaller than a split pea, immediately in front of the tragus, probably represented a supernumerary auricle. On the left side the ear and hearing were normal. The existence of the condition was unknown to the mother, and is the first case I have seen in the examination of over 10,000 children.

Coats states, in his *Manual of Pathology*, fifth edition, p. 1257:

> Congenital contraction and closure of the canal have been observed in various degrees.

With regard to treatment, Lake, in his *Handbook of Diseases of the Ear*, second edition, p. 70, says:

> It is generally useless to attempt to restore the external meatus, as there is in these cases bony occlusion of the canal beyond the membranous cul-de-sac.

Swansea. THOS. E. FRANCIS, M.D., B.S., D.P.H.

Reports

ON

MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS AND ASYLUMS OF THE BRITISH EMPIRE.

WESTMINSTER HOSPITAL.

CASES OF HIRSCHSPRUNG'S DISEASE.

(Reported by GORDON R. WARD, M.R.C.S., L.R.C.P., House-Surgeon.)

HIRSCHSPRUNG'S disease, which is, perhaps, better known as "idiopathic dilatation of the colon," seems always to involve some loss of the motor function, whatever the other facts may be. Excessive length of the gut or mesentery are often associated, as in one of these cases about to be mentioned. What exactly the atonic condition depends on is a matter of dispute, but its resulting symptom—namely, constipation—is always prominent.

Of the three cases now to be recorded the first illustrates the condition in childhood, with death from constipation and auto-intoxication. The second illustrates a less severe type, but with death from complications. The third is one in which the symptoms were relieved from the time of operation. I am much indebted to Mr. W. G. Spencer for permission to publish these cases, which were under his care at the Westminster Hospital.

CASE I.

H. F., female, aged 3 months, had suffered since birth from extreme constipation. There had been no action of the bowels during the six days previous to admission. The child was wasted, and vomited frequently, the abdomen was distended, and the coils of the intestine were plainly outlined, even in the absence of peristalsis. Medical treatment proved of no avail, and an operation appeared to offer the only chance of life, although a slender one. Mr. Spencer accordingly performed a laparotomy, and tied a gastrotomy tube in the colon. Any more protracted operation was contraindicated by the condition of the patient. The patient died twelve hours later.

It is possible that this life might have been saved had the patient come under medical observation earlier; but, as it was, the *post-mortem* examination showed that there was already considerable ulceration in the splenic region, involving all but the peritoneal coat, while the rest of the colon was much congested and thickened. There was no very marked increase in length.

Such cases are not very hopeful from the point of view of treatment, and if purgatives, careful attention to diet, etc., are of no use, operation should be resorted to early. If by means of an appendicostomy or colostomy, lavage and the direct application of remedies to the colon can be resorted to, there is some hope of establishing the requisite amount of "tone." Nevertheless, it is obvious that in the case of young children, especially those of poor or ignorant parentage, the prognosis must always be grave.

CASE II.

G. S., male, aged 52, was admitted with symptoms of intestinal obstruction. The pulse-rate was 112, and there was distinct suggestion of general peritonitis. The history showed that he had been suffering from partial obstruction for ten days. As far as he could remember, he had always been the subject of more or less obstinate constipation, and had had more than one attack similar to the present one, but less

severe. Mr. Spencer explored the abdomen, and found the sigmoid much lengthened and enormously distended. It was bent upon itself, and lodged under the ziphi-sternum; there was a resulting volvulus at the lower end, the folding having occurred at the site of old adhesions binding the sigmoid to the region of the ileo-caecal valve. Lesser adhesions were present in other situations, and there was commencing general peritonitis. A large part of the sigmoid was excised, and an ileo-sigmoidostomy performed. Appendicostomy was also performed for the reasons above cited. The operation was one of great difficulty, and consequently of unusual duration.

The patient lived twenty-four hours afterwards, but to such a degree had the paralysis of the gut proceeded, that it was not found possible to relieve it by saline injections or other means.

At the *post-mortem* examination the peritonitis was found to have increased in degree, and the bowel was almost ulcerated through at the site of the thickest adhesions. It cannot be doubted that at this point organisms from the bowel could easily have obtained access to the peritoneal cavity.

This, then, illustrates lengthening and distension of the gut, with slight attacks of peritonitis leading to adhesions. Presumably these attacks were local only. The adhesions in turn appear to have been an important factor in determining a volvulus. The volvulus occurring at a point where the bowel was already weakened, and no doubt exercising more traction the more it became distended, predisposed to ulceration. At the site of ulceration perforation was obviously imminent. It is noteworthy that the symptoms of volvulus had existed for ten days, but the onset of peritonitis had much increased the gravity of the patient's condition.

Probably this patient by unremitting attention might have so regulated his bowels as to obviate the attacks of localized peritonitis. When once these had occurred the formation of adhesions made serious complications sooner or later almost inevitable. Even so resection of the sigmoid ten days earlier might have given him many more years of life, but the condition found at operation showed that the disease had been allowed to progress too far.

CASE III.

H. C., male, aged 26, was admitted for radical cure of a left inguinal rupture. It was found that his abdomen was much distended and that he vomited once or twice a day. He gave a history of vomiting previous to the appearance of the hernia, and of constipation for as long as he could remember. As there was some doubt as to what part the hernia might have as causing these symptoms Mr. Spencer performed a radical cure. This, however, did not stop the vomiting. The abdominal distension could be relieved by a series of enemas, but recurred almost immediately. A laparotomy was accordingly performed, but nothing was found except slight thickening of the colon. Mr. Spencer tied a tube in the appendix and closed the exploratory incision. The patient had magnesium sulphate ℥ss in a pint of water through the appendicostomy tube every day after. The vomiting and distension immediately ceased. The patient remains in hospital at present, but is getting about and has a good appetite. There is every reason to suppose that the tone of the colon is being gradually restored.

This case shows very well the great value of the direct application of remedies to the colon with daily lavage. Although the distension could be abolished by means of a series of enemas, this treatment was too severe to allow of its long continuance. The constipation had always been a source of inconvenience, but the vomiting was of more recent occurrence. Why this should be so is not apparent—possibly the hernia acted as an aggravating factor, yet it is to be remembered that its cure gave no relief.

These cases exemplify three of the many different clinical pictures which Hirschsprung's disease may present. In all of them the one symptom, constipation, was present, and all gave a history that it had been so as long as they could remember. In all medical treatment had proved of no avail, either from inherent impossibility or from lack of the necessary persistence. Nevertheless, there are many slighter cases which can be dealt with by other than surgical means, and these are often not easy to distinguish from constipation due to other causes. Hirschsprung's disease, strictly speaking, can never be acquired; but there is no doubt that a similar degree of atony can be reached from other causes, and such cases have been successfully dealt with by the surgeon. But although resection of the sigmoid and ileo-sigmoidostomy have been performed with brilliant results, it seems evident that appendicostomy ought first to be tried.

Since these notes were made, Case III has been discharged from the hospital. The appendicostomy opening has been allowed to close, and there is no return of unpleasant symptoms.

Reviews.

HYGIENE.

SOME idea of the scale on which Brouardel and Mosny's treatise of hygiene[1] has been projected may be gathered from the fact that the present *fascicule*, No. XII, on the general hygiene of towns and centres of population, is a closely printed volume of over seven hundred pages. Altogether twenty of these volumes are to be issued under the direction of Professor CHANTEMESSE and Dr. MOSNY, the former having undertaken the work initiated by the late Professor Brouardel. The titles of these volumes alone indicate that the work when completed will form a veritable encyclopaedia of public health, and the names of the contributors, including nearly all the best known sanitarians, and the principal public health officials in France, are sufficient guarantee of its authority. The present volume, dealing with the general sanitation of cities, towns and urban districts, is the largest, and will doubtless prove one of the most important of the series. It is impossible in the limits of a short review to do more than indicate its scope. Briefly it may be said that none of the problems of modern sanitation is left untouched, but some are dealt with in much greater detail than others. This is doubtless because this volume is intended primarily as a general survey of the subject, portions of which will be dealt with in greater detail in subsequent fasciculi dealing with special subjects. About half the present volume is the work of Professor Macé in collaboration with M. Imbeaux, chief engineer of roads and bridges under the Government, and consists of a general survey of the history of sanitation, the general conditions affecting the health of modern towns, the causes of ill health and the means of preventing it. The last item includes elaborate essays on population, water supply, housing, road making and cleansing, disposal of sewage, refuse, etc., and, in fact, all the problems nowadays included under the study of public health. The amount of information derived not only from cities and towns in France, but from the whole of Europe, with statistics and comparative tables, will make this part of the book permanently valuable as a work of reference. The analyses of various forms of refuse other than sewage are of particular practical value, and not usually to be found in English textbooks of the subject. Housing is very fully treated in all its bearings, and there is a well-illustrated section on ventilation, which in itself is almost a textbook. On the other hand, it is disappointing to find the question of isolation hospitals dismissed in a few lines, and no light thrown on the somewhat burning question of the value of isolation hospitals for scarlet fever. No doubt, however, this will be dealt with in the volume on hygiene of hospitals. It is interesting to note that the French schedule of notifiable diseases differs considerably from ours, and that measles has been included by the Act of 1903. The importance of this is shown by the fact that in 1905 the deaths in Paris from measles were just ten times as many as those from scarlet fever, namely, 424 to 43, which is roughly about the proportion prevailing in this country, where measles is still regarded officially as a trivial complaint. The whole subject of sanitary administration is dealt with in great detail by M. Bluzet, Inspector-General of the Administrative Services under the Ministry of the Interior. This section should be of especial interest to all engaged in sanitary administration in this country, affording as it does an admirable basis for comparison of our own methods with those of other nations. Administration in France is greatly simplified by the Act of 1902, which modernizes and consolidates the previous laws and appears to govern the whole field of sanitary administration, including notification, vaccination and revaccination, housing, water supply, drainage, food and drugs, etc. Perhaps only those who have had to make their way through our maze of more or less contradictory statutes will realize the extent to which this must make for efficiency. The last part of the book, by M. Paul Adam, deals with industrial hygiene, and is no less interesting than the rest. Altogether the

[1] Brouardel et Mosny, *Traité d'hygiène*, publié en fascicules sous la direction de Mons. Chantemesse et E. Mosny. XII. *Hygiène générale des villes et des agglomérations communales*. Par E. Macé, Albert Bluzet, Ed. Imbeaux, et Paul Adam. Paris: J. B. Baillière et Fils. 1910. (Sup. roy. 8vo, pp. 711. Fr. 12.)

work is one which no modern public health library can afford to be without.

The third edition of Dr. D. H. Bergey's *Principles of Hygiene*[2] brings this useful volume thoroughly up to date. Although a fairly bulky volume, the ground covered is so wide that the great merit of the book is its brevity. With the exception of sanitary law and administration, every other aspect of public health work is dealt with; and though most of these subjects are considered in some detail, the book remains an exceedingly readable one. It does not pretend, however, to be exhaustive, and while providing an excellent introduction to the modern study of sanitation, it must be read in connexion with some of the standard books of reference by all serious students of the subject. The author is especially to be congratulated on the chapter on immunity, which forms one of the best summaries of the history and present position of modern views on this subject which we have yet seen. The chapters on air and ventilation, disposal of sewage and refuse, water supply, housing, and building construction, are alike very full and excellent, but the chapter on disinfection is less satisfactory. In proportion to the space given to chemical and other modes of disinfection, it seems strange that steam disinfection and the principles involved should be dismissed in a brief paragraph and a footnote. The book is, of course, written from the American standpoint, but differences in procedure in other countries are usually explained. The book can be unhesitatingly recommended to all who are commencing the study of public health.

In a little more than a hundred pages Colonel J. Smyth, M.D., I.M.S., gives us the results of a brief mission to Japan, which was undertaken on behalf of the Government of Mysore. With the instinctive modesty of one who does good work almost without knowing it, the author states that his object was to "find something in Japanese sanitation that would be useful in India." As a matter of fact, his *Notes on Applied Sanitation in Japan*[3] form a really important contribution to the English literature of Japan, and should be studied not only by sanitarians, but by all students of that remarkable country. There are a few classic works in English dealing with Japan and the Japanese, notably, of course, the writings of the late Lefcadio Hearn, but much of the recent literature on the subject has given us but platitudes on scenery and art, with the tripper's point of view of the people. It is impossible to read Colonel Smyth's pages without feeling that this monograph of a trained observer studying his own subject does more to interpret the Oriental mind to the Western than many volumes of the superficial observations of the amateur. There are few subjects which touch the intimate social life of a population on more points than that of sanitation, and Colonel Smyth has approached his subject in no narrow spirit, as will be seen from the fact that his inquiry extends not only to the subjects generally included under the term sanitation, such as housing, water supply, disposal of refuse and excreta, drainage, etc., but to such matters as marriage laws, prostitution, liquor regulations, opium, lunacy, and prisons. In public health administration the Japanese have shown the same remarkable powers of selection and assimilation of European methods that in other matters have placed them alongside the foremost Powers of Europe. As Colonel Smyth says:

> Though one of the proudest people in the world, the Japanese have not mingled stupidity with their pride, but have gone forth into the wide world, sitting humbly at the feet of experts in these matters, wherever they could find them; or they have invited such to their schools and colleges, and, having thus armed themselves with the most varied knowledge and experience, they have whole-heartedly adopted whatever they found beautiful, and good, and useful, and applied it to their daily life.

This rapid transformation has been possible in Japan as it would have been nowhere else, because, however repugnant to the tastes and traditions of the people a change might be, if "the Emperor had given the order," the order was obeyed; because, as Colonel Smyth says on another page, "what suits one Japanese suits all Japanese." We have not space to do more than refer briefly to a few of the many technical subjects considered in this work. The scheme of public health administration, central and provincial, is so simple that Colonel Smyth is able to demonstrate it by two simple tables. The chief problem is the prevention of the following eight diseases: Typhus and typhoid fever, cholera, small-pox, diphtheria, plague, dysentery, and scarlet fever. Every town of any size has its public health laboratory, fully equipped and manned, which deals not only with infective disease, but with food, water, etc. The water supply is mainly derived from wells sunk by a special class of workmen, the Idohori. With a very primitive looking apparatus these men are very skilful and successful borers. They are also water-finders, but make no pretence to superhuman knowledge like our "diviners" with their hazel-twigs and humbug. Where the Japanese sanitary arrangements fail from a Western point of view is in the disposal of excreta. Anything comparable to our water-carriage system would be repugnant to their thrifty minds, and "there is no waste in Japan." All night-soil, etc., is conserved in pits, and afterwards applied directly to the land without further treatment. It appears that in cold weather no nuisance is caused, but what the result must be in hot weather, with the flies about, one can only guess. With a water supply derived from wells, one is not surprised that cholera and typhoid are still among the unconquered foes. Vaccination and revaccination at 5 years of age are compulsory, and the arrangements for the preparation and distribution of lymph is at least equal to anything in this country. Medical inspection of schools is very thoroughly organized, but it is curious to come across the complaint about unpaved and dirty schoolyards with which we are so painfully familiar at home. Colonel Smyth spent only some four weeks in Japan, and repeatedly regrets the incompleteness of his observations. But it must have been four weeks of assiduous work, of which his report is a brilliant and delightful summary. He wishes that he had more time in the country, and all who read his book will share that wish. We could hardly have too much of so good a thing as this.

[2] *The Principles of Hygiene: A Practical Manual for Students, Physicians, and Health Officers.* By D. H. Bergey, A.M., M.D. Third edition. Philadelphia and London: W. B. Saunders Company. 1909. (Med. 8vo, pp. 555; illustrated. 13s.)

[3] *Notes on Applied Sanitation in Japan.* By Lieutenant-Colonel J. Smyth, M.D., I.M.S., Sanitary Commissioner in Mysore. Bangalore: Printed at the Government Press. 1909. (Roy. 8vo, pp. 117. 2 rupees.)

OPHTHALMOLOGY.

Ophthalmic Surgery[4] is a book dealing with operations, by Charles H. Beard, of Chicago, and it is thoroughly American throughout. Some of the directions can scarcely be considered applicable to English surgeons at all. On the first page, for instance, when the author is discussing what he terms "paraoperative technic," he states that "we should acquire the habit of surgical cleanliness." "Unless one is broadly grounded in this training, he is being for ever the victim of his own anticlimaxes, as, for example, picking his teeth with his finger-nails, scratching his head, or taking an instrument between his lips after the most elaborate and up-to-date preparations for an operation." We should hardly expect that any civilized being, much less a surgeon, would be guilty of such practices. He might as well insist that a surgeon should wash his hands after performing an autopsy before starting an operation. We are told on page 484 that

> A jab of the thumb, knuckle, or scrub-brush could, in the eye of these senile subjects, lead to very unpleasant results.

This obvious statement is hardly likely to be contradicted by any one, and most intelligent beings would scarcely want to be told this. Again, the surgeon is warned against "storming, gesticulating, yanking" (whatever that is), "thumping, and even swearing at the patient." After a description of the operation for cataract, a chapter follows headed "Don'ts," in which we are told all sorts of curious things which are to be avoided. The accident of inserting the cataract knife upside down when making a section is termed a "serio-comic dilemma." Where the comic element comes in is certainly not very apparent. All the various operations in general use are fully and well described, while the illustrations are excellent and very numerous. Were it not for the extremely idiomatic

[4] *Ophthalmic Surgery.* By Charles H. Beard, M.D., Chicago. London: Rebman, Limited. 1910. (Roy. 8vo, pp. 680; 9 plates, showing 100 instruments, and 300 other illustrations. 22s.)

American in which it is written, the book would form very pleasant and instructive reading. As it is, one is so frequently brought up with quaint and original expressions that, until one gets used to it, it is difficult to follow by any one who is unacquainted with this peculiar sort of English. Notwithstanding the eccentricities which we have pointed out, the work is not without value as an addition to existing works on the operative surgery of the eye.

We are glad to welcome the second edition of *Colour Blindness and Colour Perception*, by Dr. F. W. EDRIDGE-GREEN.[5] The first edition had been exhausted, but so thoroughly was the work done which formed the basis of the first edition (in 1891), that during the interval of nineteen years we notice but little change in the volume; and although it is now brought fully up to date, yet the essentials of the book remain the same. Really, the volume is so little altered that any one who has the first edition will, if he assimilates the information it gives, know almost as much about the subject as he would by reading the second edition. A greater compliment to a piece of work could hardly be given than this, and yet it is not a mere compliment, but a matter of hard fact. That Dr. Edridge-Green's views were revolutionary when they were first brought out many people will remember. His book met with a storm of adverse criticism, and many there were who, while not taking the trouble to understand it, assumed a superior air, and said it was not worth criticizing or considering, so erroneous were the views expressed. Until the last few years that was supposed to be the correct attitude to take; the physicists took it, and so did many ophthalmic surgeons and physiologists who ought to have known better. It was a case which might be compared to the proverb of giving a dog a bad name, and Dr. Edridge-Green got metaphorically hung in consequence. This, however, is all ancient history now. No one who has taken the trouble to investigate the facts has gone away unconvinced, and the ideas expressed are held so generally now that many people would say that the book really contained nothing controversial. How different public opinion was a few years ago can be appreciated only by those who have watched the persistency of Dr. Edridge-Green in trying to obtain a fair hearing for his side of the case. Practically the whole of the new matter is contained in an appendix of 11 pages, and this tells what has been done during the last few years. The theory and the facts remain as they were when first published, so thoroughly was the work done. It is quite unnecessary in a short review like this to enunciate the theory and ideas with which the book abounds, anyone who wishes to find that out can read them for himself, but suffice to say that whoever desires to know the truth about colour-blindness, and who is in the habit of testing men for public services, should have this book at his right hand until he has thoroughly mastered its contents. If this be so, and if colour-vision examiners are medical men, we should have far fewer men passed who are dangerously colour blind for the sea and land services in which coloured lights and signals are used, and we should also avoid the scandal which at present exists whereby many and many a normal-sighted person is rejected from employment wrongfully, just because examiners who are ignorant of their subject are provided with inefficient and obsolete tests.

The *Atlas of External Diseases of the Eye*,[6] by Dr. RICHARD GREEF of Berlin, is really a beautiful book. There are in it 84 coloured illustrations, and 54 plates with explanatory text. It has been translated from the German by Dr. P. W. Shedd, of New York. The book has been reproduced in an altogether exceptional way. As a rule the cases are depicted by an artist, with the patient as his model; but here Dr. Greef has worked in conjunction with a sculptor, F. Kolbow, who has made wax models of important external diseases of the eye. The plates were obtained by making a mask of the living subject, which was then filled with wax, and from the wax models photographic reproduction in four colours was made, and so "a pictorial plasticity" was obtained which is impossible in a drawing. Most of the plates are excellent, and better than anything we have before seen published, though it must be confessed that a few of the plates are not quite up to the high standard set by others in the atlas. The most worrying part of the whole book is the extreme "Americanism" met with in the translated text. Some of the sentences have to be read more than once to see what they really mean, and the translator is evidently a follower of the "nu spellin" school. Except for these imperfections we have nothing but praise for the excellent work of Dr. Greef and his sculptor, while the atlas will make a very great addition to those which already exist.

Dr. WEBSTER FOX is a prolific writer, and he has now brought out a *Practical Treatise on Ophthalmology*,[7] which reminds us very forcibly of another book published by him in 1904, called *Diseases of the Eye*. Papers and even chapters are taken from it wholesale, and if this new volume was termed a second edition of the old, it would not be in any way stretching the point. Of course there are many alterations and much new material, but that would be natural in six years. We are glad to see that the author gives comparatively little space to the description of the way to pass large probes and styles down the nasal duct; instead, there is a lengthy and detailed description, with excellent illustrations, of the way in which the lacrymal sac may be extirpated. The chapter on colour blindness is more up to date than is usually seen in most textbooks, which are content to copy from one to the other, and to ignore modern work and views; not that this chapter is free from antiquated views by any means, but it also describes the ideas which are now being universally adopted, though, like many old ideas, those on colour blindness die very hard. The ordinary regional diseases are described under their respective heads, and chapters are given up to refraction, muscular errors, bacteriology, and histology. The various operations are described under the structures which they chiefly concern. The book is absolutely nothing but a second edition of *Diseases of the Eye*.

This book, *Manuel de neurologie oculaire*, by F. DE LAPERSONNE and A. CANTONNET,[8] of upwards of 350 pages, is divided into two parts. The first deals with the anatomy and physiology of the eye and its nervous mechanism, together with the symptoms produced by lesions of the same, while the second part is concerned with the nervous affections of the eye in different diseases. Some very excellent anatomical drawings, many of them coloured, serve to illustrate the section dealing with anatomy, and some of them are as good or better than are commonly met with in many anatomical textbooks; they are, however, mostly taken from other authors. The methods of clinical examination are illustrated by cuts representing the position of the patient and surgeon during the process. In the description of the very puzzling examination of diplopia with a red glass and a candle, the position of the different images is tabulated so as to render it more clear. Illustrations are one of the features of the book, and many conditions are shown chiefly taken from photographs of actual patients. The book is thorough and complete, and faithfully describes and discusses the many problems connected with the ocular nervous system.

The twenty-ninth volume of the *Transactions of the Ophthalmological Society of the United Kingdom* has now been published, and consists of the papers read before the society during the session 1908–9.[9] The Bowman Lecture, on some hereditary diseases of the eye, which was delivered by Mr. Nettleship, is given in full, and it is a marvel of patient and industrious work. It is done in that thorough and painstaking style so characteristic of the author. It is impossible to mention, even by name, the numerous papers and rare cases described, all of which

[5] *Colour Blindness and Colour Perception*. By F. W. Edridge-Green, M.D., F.R.C.S. Second edition. The International Scientific Series, vol. lxxi. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1909. (Cr. 8vo, pp. 334; 3 coloured plates. 5s.)

[6] *Atlas of External Diseases of the Eye, for Physicians and Students*. By Dr. Richard Greef, Professor of Ophthalmology in the University of Berlin. Only Authorized English Translation by P. W. Shedd, M.D., New York. London: H. K. Lewis. 1910. (Imp. 8vo, pp. 148. Coloured illustrations 34. 42s.)

[7] *A Practical Treatise on Ophthalmology*. By L. Webster Fox, M.D., LL.D. Philadelphia, New York, and London: D. Appleton and Co. 1910. (Roy. 8vo, pp. 833; 6 coloured plates, 300 illustrations. 25s.)

[8] *Manuel de neurologie oculaire*. By F. de Lapersonne and A. Cantonnet. Paris: Masson et Cie. 1910 (Demy 8vo, pp. 374; 106 figures. Fr. 6.)

[9] *Transactions of the Ophthalmological Society of the United Kingdom*. Volume xxix. Session 1908-9. London: J. and A. Churchill. 1909. (Demy 8vo, pp. 428. 12s. 6d.)

are of great interest and importance. The illustrations consist of coloured plates, black and white plates, and text illustrations, and they are all excellent. The volume fully maintains the high reputation which has been gained by its predecessors, and the council and secretaries deserve credit for the way in which they have carried out their arduous duties of collecting, editing, and arranging the papers.

Manual of Military Ophthalmology is a small book of about 220 pages by Lieutenant-Colonel M. T. YARR, R.A.M.C., the second edition of which has now appeared.[10] Colonel Yarr is so well known as an accomplished ophthalmologist that it is a distinct disappointment to find that although he states the book has been carefully revised and brought up to date yet inaccuracies abound, and many of the ideas expressed are by no means those which are now usually held. On p. 10 is an error which certainly ought not to have escaped detection. In talking of Snellen's distance types, we are told that each part of the letter is arranged so that at its given distance it subtends an angle of 5 degrees, while each part of the letter subtends an angle of 1 degree. What huge letters they would be, just 60 times the size they now are; 5 minutes and 1 minute should be the figures. In the paragraphs on colour vision nothing more recent is given than the all but exploded Young-Helmholtz theory, and no test is recommended for the detection of colour blindness other than the much discredited and inefficient matching test of Holmgren. In treating of retinoscopy, the observer is recommended to place himself 4.5 metres from the patient when using a plane mirror. One wonders how long it would take to do a dozen retinoscopies like this, and how long the surgeon would take walking backwards and forwards between the patient and the stool. He would walk a very considerable distance doing the work of an ordinary out-patient clinic. On page 66 we are told that "Mr. Silcock takes exception to it." Is the author unaware that the profession and the public had to mourn the death of that distinguished surgeon five years ago? The ancient and barbarous operation of slitting canaliculi, and the passage of probes "of the largest size" is advocated for the treatment of lacrymal obstruction, and we are told in the final paragraph that "in bad chronic cases an attempt may be made to dissect out the sac, but this is a most difficult operation and seldom successful." If anyone finds it difficult it is because he does not know how to do it, and the majority of surgeons would rather state that it is an easy operation and always successful. The only operation for ptosis given is that complicated one devised by Panas, which, although it gave good results in the hands of the inventor, yet no one scarcely has since had any good results with it, while the majority are so bad that it is all but universally given up. An obsolete tortoiseshell spoon which will not stand boiling is figured as the correct instrument with which to express a lens in the operation for cataract. It is with a feeling of genuine disappointment that these defects are pointed out, for the author is equal to producing a far better and more up-to-date book, and we trust it will not be long before a third edition is issued which really is up to date, and thus a book which we genuinely admire for its many good qualities will take its place among the small books on ophthalmic surgery.

Notes on Cataract Extraction, by Major R. H. ELLIOTT, I.M.S., of Madras, is published in a small book on *Four Common Surgical Operations in India*,[11] by Major P. C. GABBETT, I.M.S. The other three operations are those for hernia, hydrocele, and elephantiasis. We have here to deal only with the part contributed by Major Elliott, which forms the fifth chapter. It consists of but eighteen pages, and is written from a purely practical standpoint. He first tells the beginner how to recognize easy and straightforward cases from the more difficult ones, and he warns anyone to ensure as far as possible that his early cases shall be successful, otherwise he will find the greatest difficulty in subsequently gaining the confidence of the natives. Then he deals with the preparation of the patient and of the instruments, and assumes that the operation will be done with iridectomy, and by the ordinary method of lacerating the capsule, followed by irrigation of the anterior chamber. With a master's eye in detecting the faults of the beginner, he deals with those most likely to be made by the tiro, and explains at length how these are to be avoided and overcome, and finally he gives directions for the treatment of complications which may occur during the healing process. These few pages represent the practical knowledge of an expert, and cannot fail to be of the greatest use to those who are about to commence their career as ophthalmic surgeons. To those whose experience, though relatively large in this country, yet is quite insignificant when compared with that of Major Elliott, we heartily commend this little book, as we feel sure there are but few who will not derive benefit from its perusal.

Optical Instruments Simply Explained[12] is one of a series of books called the Model Engineer Series, and this particular one is written by H. T. DAVIDGE, B.Sc. They cost but 6d. each, and are in paper covers and well illustrated. The one under review is the thirty-fifth of the series, all of which deal with different branches of science. It consists of 83 pages, and a very good description is given of all the common optical instruments—for example, telescopes, microscopes, cameras, spectroscopes, and sextants. Reflection from mirrors and refraction of light by lenses is explained and a description of the eye and sight is given, this latter being the least satisfactory in the whole book. Naturally the subject is not treated in anything like a full manner, but the chief points are well and carefully explained, and for anyone who knows nothing about the subject much useful information may be gleaned.

A second edition of *Errors of Refraction and their Treatment*,[13] by CHARLES BLAIR, has recently appeared. It is a very small volume consisting of about one hundred pages, and is intended "to supply in a condensed form the more practical and clinical points in connexion with errors of refraction," and thus the author hopes it may be of use to some who are not able to give much time to the study of refraction. As a cram book it is good enough, but because it is so condensed it requires rather more knowledge than is possessed by one ignorant of the subject really to understand it. The book is well written and deals in a practical manner with the many points which are met with in a study of refraction errors of the eye. As a very small book it is quite equal to any of similar size with which we are acquainted.

MALTA FEVER IN UGANDA.

SIR DAVID BRUCE and the other members of the Sleeping Sickness Commission of the Royal Society, 1908–10, have recently shown that "muhinyo,"[14] a native name for a disease prevailing in parts of Uganda, is nothing more nor less than Malta fever. The principal focus of the disease is along the eastern shore of Lake Albert Edward, spreading from there in a south-easterly direction into Ankole. The tribes most affected by the disease are the Bakonjo and the Basongora, both of whom drink the milk of goats and cattle. The symptoms, analysed from 50 cases seen by Sir David Bruce at Masaka, were fever, profuse sweating, pains in the joints and along the course of the nerves, swelling of the various joints, especially the ankles, and extreme weakness and emaciation. The duration of the disease was a long one, most of the patients seen having been ill for several months, and one had been ill for two years. That the disease was Malta fever was abundantly proved by the examination of these cases for agglutinative phenomena, and also by the isolation of the specific germ from their bodies—the goats were in turn

[10] *Manual of Military Ophthalmology for the Use of Medical Officers of the Home, Indian, and Colonial Services.* By M. T. Yarr, F.R.C.S.I., Lieutenant-Colonel R.A.M.C. Second edition. London: Cassell and Co., Limited. 1909. (Fcap. 8vo, pp. 228. 6s.)

[11] *Four Common Surgical Operations in India. Notes on Operations in India for Hernia, Hydrocele, and Elephantiasis.* By Major P. C. Gabbett, I.M.S., Professor of Surgery, Madras. *Notes on Cataract Extraction.* By Major R. H. Elliott, I.M.S., Superintendent of Ophthalmic Hospital, Madras. Madras: Higginbotham and Co., and London; Luzac and Co.; or H. K. Lewis. 1910. (Demy 8vo, pp. 57. 2s.)

[12] *Optical Instruments Simply Explained.* By H. T. Davidge, B.Sc., M.I.E.E. The Model Engineer Series, No. 35. London: Percival Marshall and Co. (Cr. 8vo, pp. 83. 6d.)

[13] *Errors of Refraction and their Treatment: A Clinical Pocket-book for Practitioners and Students.* By Charles Blair, M.D., F.R.C.S. Second edition. Bristol: John Wright and Sons, Limited; and London: Simpkin, Marshall and Co., Limited. 1910. (Fcap. 8vo, pp. 106. 2s. 6d).

[14] "Muhinyo." A disease of natives in Uganda. Read before the Royal Society, June 30th, 1910.

next tried, and after some of these from Ankole had been shown to react to the agglutination test, an attempt was made to isolate the micrococcus from their tissues, this being successful in two cases. Thus the chain was completed and the two diseases demonstrated to be one. The discovery adds another area to the rapidly extending geographical distribution of Malta fever.

NOTES ON BOOKS.

MR. W. H. MARTINDALE'S *Organic Analysis Chart*[15] is a supplement to the well-known *Extra-Pharmacopoeia*, and consists of a tabulated record of melting point, solubility, reaction, and behaviour with common reagents, of a large number of organic substances used in medicine. The "chart" is intended as a guide for identifying any such substance by a simple examination; the particulars mentioned are given for over 300 bodies, including alkaloids, glucosides, synthetic substances like antipyrin and veronal, with many others which do not come under any of these heads; confirmatory tests are given in a separate section. The tables should prove of much use and convenience to chemists and others who may require to identify such substances.

A copy of *Low's Handbook to the Charities of London*[16] which has reached us is the seventy-fifth annual edition of this useful reference book. It is the senior publication dealing with the subject, and making its appearance in the middle of each year contains accounts of changes which have taken place subsequent to the issue of other like books. All the charities with reference to which information is given are placed in alphabetical order, and all those seem to be included which have their head quarters in London, wherever the actual work may be carried out. It is easy to use, and the information given is, as far as we have tested it, correct. This year's preface consists of an interesting sketch of the history of orphanages. The price of the volume is so small as to bring it within reach of all.

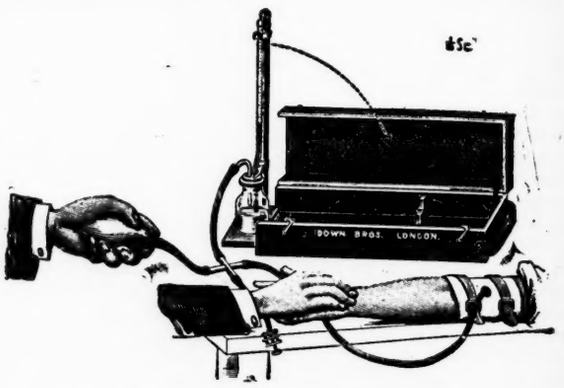
The eighth edition of SQUIRE'S *Pharmacopoeias of the London Hospitals*[17] follows its predecessor at an interval of ten years, during which time twenty-six of the thirty-two hospitals whose formulae are dealt with have produced new editions of their pharmacopoeias; it is obvious, therefore, that for all prescribers or dispensers who require to have a complete collection of the formulae in use in the hospitals in London, the new edition of this work is a necessity. The same plan is followed in this as in previous editions: preparations are arranged in alphabetical order, and each formula is for the most part restricted to the names and quantities of the ingredients, and is followed by the names of the hospitals adopting it. A very large amount of information is thus given within the compass of a book which can be put in the pocket.

[15] *Organic Analysis Chart.* By W. Harrison Martindale, Ph.D. A supplement to the *Extra-Pharmacopoeia*, fourteenth edition. London: H. K. Lewis, 136, Gower Street, W.C. 1910. (16mo, pp. 80; 3s. 6d.)
[16] *Low's Handbook to the Charities of London.* Seventy-fifth edition. London: Eliot Boothroyd. 1910. (1s.)
[17] *The Pharmacopoeias of Thirty of the London Hospitals.* By Peter Squire. Eighth edition; revised by Peter Wyatt Squire. London: J. and A. Churchill, 1910. (Fcap. 8vo, pp. 496. 5s.)

MEDICAL AND SURGICAL APPLIANCES.

A New Form of Sphygmomanometer.

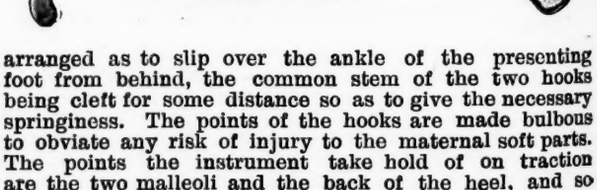
DR. HERBERT FRENCH (Assistant Physician to Guy's Hospital) writes: This apparatus consists of a vertical mercury manometer connected, as shown in the diagram, with a four-way glass cannula, the other three limbs of which lead to a rubber air bellows, a broad rubber bag enclosed in canvas for encircling the arm, and a clip for letting out air when required. The principle is similar to that of various other sphygmomanometers devised for measuring the maximum systolic blood pressure. Most instruments of the kind, however, have the disadvantage that, until fixed up, they are not ready for immediate use, and that, unless great care is used, the mercury is very apt to become spilled, and that if the apparatus is carried to a consultation at a distance much time is taken up in packing it so that nothing will go wrong with it *en route*. These disadvantages are obviated by the instrument here described. The box into which it fits has one of its narrow sides hinged, and to this the mercury bottle is fixed in such a way that the whole manometer can either stand vertically, as in the illustration, or else be rotated down in the direction indicated by the dotted line and arrow until it lies flat in the box. The length of the glass manometer tube and the amount of mercury in the bottle are so adjusted that whereas the lower end of the tube is immersed in the mercury when the manometer is vertical the tube leaves the mercury some little time before it reaches the horizontal position. The result of this simple adjustment is that the mercury cannot become upset whatever position the apparatus is in. It is something like the inverted ink-well in this respect. The great advantage of this is that as soon as a reading has been taken the manometer and its attachments can be laid down flat in the box, and the latter can be carried in any position—even upside down—without any spilling of the mercury. The apparatus can be carried amongst one's



luggage, and yet on arrival it is ready for immediate use. When it is required all that has to be done is to open the box, rotate the manometer into the vertical position, and take a reading in the ordinary way. Owing to the hingeing of the mercury bottle to the main box, no clamp is required to prevent its upsetting. There are minor points about the instrument, such as a contrivance for making the mercury in the manometer rise or fall smoothly, when blood pressure is being measured, without the wide jumpings and oscillations which are apt to occur in the case of some other forms of apparatus. As will be obvious, however, when the instrument is seen, the main advantage claimed for the sphygmomanometer is that whilst giving direct readings in millimetres of mercury it is so constructed as to be equally and instantly ready either for transit to a distance or for immediate use upon a patient. The instrument is made by Down Bros., Ltd., St. Thomas's Street, London, S.E.

An Obstetrical Instrument.

Dr. THOMAS FENTEM (Catcliff, Bakewell) writes: Every one engaged in obstetrical practice must have experienced difficulty in grasping a foot, in a footling presentation, with sufficient firmness to enable him to bring the leg readily down, even when the foot is easily reached with one or two fingers. To assist in situations like this I have devised an instrument, the general characters of which are shown in the accompanying figure. It will be observed my instrument consists of a double hook so



arranged as to slip over the ankle of the presenting foot from behind, the common stem of the two hooks being cleft for some distance so as to give the necessary springiness. The points of the hooks are made bulbous to obviate any risk of injury to the maternal soft parts. The points the instrument take hold of on traction are the two malleoli and the back of the heel, and so firm a hold is taken that I have been able to lift the buttocks of a newly-born child off the bed without the instrument slipping. The end of the handle is carried forward as a beak, in the same direction as the points of the hooks, so that one is at all times aware in which direction the hooks are pointing. The extreme length of the instrument is 10¼ in. I have found the instrument easy of application and effective for the purpose for which it is designed. It has been made for me, from my model, by the Medical Supply Association, Holly Street, Sheffield.

LONDON COUNTY COUNCIL.

Annual Report of the Medical Officer for Education for 1909.

The seventh annual report made by Dr. James Kerr Medical Officer (Education) to the London County Council, has just been issued for the year ending 31st Dec., 1909, and it is claimed that as useful results have been obtained as ever before. In the introduction it is stated that the records of detailed medical inspection show the wastefulness of applying minute routine examination to all children, and where tens of thousands are being examined, the time taken up by recording measurements is time and money wasted unless there is a practical use for them. The inspection for nineteen-twentieths of the children only needs to be severely practical to detect defects with a view to remedies.

The Staff for Medical Inspection.

The medical staff at the end of 1909 numbered 68, of whom 12 were women. Of the total, 12 are on the permanent staff, the medical officer and his chief assistant giving their whole time, with 2 assistants giving half time and 8 quarter time to their duties. The temporary staff consists of 16 school doctors and 40 assistant school doctors, all of whom are appointed annually and are not eligible for reappointment after three years of service. The permanent staff is employed mostly on special enquiries and examinations, while the temporary staff is employed chiefly on the statutory medical inspection in the elementary schools, each giving quarter time to the work. Sixteen additional school doctors are to be appointed from Sept. 1st, 1910. The nursing staff consists of a superintendent, 2 assistants, and 51 school nurses, who undertake the oversight of personal hygiene in both elementary and secondary schools and assist the school doctors.

Inspection.

The former routine inspection was replaced in March, 1909, by the more detailed inspection required by the Education Act of 1907. The head teachers are first informed when the doctor will visit the school, and a supply of medical record cards is sent on which the teachers fill in the names and other details, and parents are notified and invited to be present at the examination. The nurse arrives at the school first to prepare a suitable room, in some cases to examine the children in regard to cleanliness, to make a preliminary vision test, to take weights and measurements, and to obtain family histories and details of previous illnesses from the parents. The doctor then examines the entrants, the leavers, and other cases selected by the teachers, and the nurse enters on the cards the results of the examination from the doctor's dictation. Where treatment is recommended, a card is given to the parents present, or afterwards left at the homes by the nurse, and the parents are impressed with the need of obtaining proper treatment. The doctor then goes over the school and notes the arrangements, the general condition of the children, and the hygiene of the school work, only making suggestions where alterations are absolutely necessary for the health of the school. The results of the examination are tabulated and sent to the Education offices. Since the Council arranged with certain hospitals and institutions for medical treatment it has been deemed advisable to examine all the children in 28 schools in the neighbourhood of the institutions. The total numbers examined were: in 39 schools having 38,399 scholars, 8,263 entrants, leavers, and selected cases were examined according to the complete scheme of the Board of Education. In 31 schools having 33,363 scholars, 5,874 entrants, leavers, and selected cases were examined by the simpler scheme of the London County Council; and in 28 schools practically all the children to the number of 23,283 were examined on the London County Council scheme. At the examinations under the complete scheme of the Board of Education about 72 per cent. of the parents invited actually attended, and the doctors spent on the average 9 min. 8 sec. over each child—that is, about 13 children were examined in two hours. Under the simpler scheme of the London County Council the average time spent by the doctor per child was 6 min. 43 sec., and when all the children in the school were examined only 4 min. 52 sec. was devoted to each. It is specially noted that, except for statistical purposes or for special objects, there is little practical value in taking all full details of every child. For the most part the sole purpose should be to note conditions which require "medical or educational" treatment. By thus limiting the work there is a great saving in cost and time, and the practical results will be equally good. The actual results of the medical inspection are summed up in several tables. In the first two groups of 39 and 31 schools the total number examined was 14,137—including entrants, leavers, and cases selected by the teachers—out of 71,762 on the rolls. The results are given as "slight" or "bad," the latter being those that required treatment. The following are noticeable: Uncleanliness, 2,923; having four or more carious teeth, 2,320; tonsils much enlarged, 2,563; adenoids, "slight," 1,122; "bad," 823; glands, slight, 775; bad, 1,929; defective vision, 1,458; eye disease, 773; ears discharging, slight, 19; bad, 324; ear disease, bad, 373; stammering, slight, 272; bad, 8; systolic murmurs and mitral regurgitation, 269; lung defects, slight, 7; bad, 209; bronchitis, slight, 35; bad, 186; rickets, slight, 57; bad, 121; effects of rickets, bad, 219; anaemia, 489; phthisis, 4 (? 11); tuberculosis, 39 (? 80); eczema, 63; impetigo, 71; ringworm, 68; normal children, 4,282. Similar tables are given for other groups of schools, but no general table for the whole is found.

Biometric Studies of School Life.

The work of Professor Karl Pearson and his school of investigators in the Francis Galton Eugenics Laboratory has given many valuable methods, the results of which, when more used by fully qualified workers, will be of great value. So far, however, probably due weight has not been given to the heterogeneous character of the material to which the methods have been applied. Reference is made to a recently published paper by Mr. D. Heron on the Influence of Defective Physique and Unfavourable Home Environment on the Intelligence of School Children. The author deals with the materials collected in the London elementary schools, and he is convinced that a full answer to the questions that concern the eugenist must depend not only on the records of medical inspection but on careful sociological surveys. "Such alone can tell us the relative weights of heredity and environment, and, above all, show us the exact environmental facts which are influential."

Anthropometry.

Measurements of stature and weight have been taken in all the schools investigated. It is said that children coming to school for the first time at the age of 8 or older are distinctly of poorer physique. So far as can be noted at present the poorest average physique is found in the low-lying areas along the Thames, and better averages on the higher ground to the north and south, corresponding roughly to poorer and better neighbourhoods. The western district, comprising Chelsea, Fulham, and Hammersmith, seem to present the poorest physique, but the available numbers are not sufficiently decisive. At the age of 5 years the average stature of boys was 104 cm., and the weght 17.1 kilos.; and of girls, stature 103.4 cm., and weight 16.7 kilos.

Dental Conditions.

The question of dental treatment has been postponed to the present summer, and there seems to be some doubt about beginning with the great task of treatment of those already in the schools. Preventive treatment while the children are still in the infant schools will probably yield the best results. Judging from the experience at the dental clinic at Kettering and similar attempts in Germany, there is doubt whether arrangements for dental treatment will be successful unless it is free of cost. The condition of the teeth of children at the residential schools bears evidence of the benefit derived from systematic inspection and treatment. In the open-air schools when first established, out of 240 children, only 14 had perfectly healthy sets of teeth, and 215 were in need either of extraction or stopping. What is known as a "toothbrush club" was formed in certain schools, a stock of toothbrushes, costing 2¼d. each, being sold to the children at 2½d., which was paid in instalments of ½d. or ¼d. a week, the small profit being used to supply the poorest children,

and precipitated chalk being sold in halfpenny-worths. Prophylaxis in this way will be far less expensive than treatment by dentists.

Personal Hygiene.

Much of the work of the 51 nurses is concerned with the personal hygiene of the children. The Council's cleansing scheme has been applied to 288 schools, and out of 80,000 children examined 16,774 were found to be verminous. The parents of 296 children were prosecuted for neglect of warnings, and fines varying from 1s. to 20s. were imposed, amounting in all to about £90. Full particulars are given of the various cleansing stations.

Medical Treatment of School Children.

It is admitted that all the present arrangements for treatment are yet on their trial. The special subcommittee appointed in June, 1907, consisted of members of the Council and representatives of various interests, and it reported after about eighteen months. The Council decided to follow the proposals of a strong Minority Report and to arrange with various voluntary institutions and charities to do the treatment, the Council paying the cost and recovering it from the parents in accordance with the Local Education Authorities (Medical Treatment) Act, 1909. The limitation of treatment to visual, aural and certain skin diseases was first put forward as a practical measure to simplify the working of the suggested establishments of the Council, but this not having been adopted and the Council having made itself responsible for treatment by hospitals and charities, we are told that "there is now no logical reason why all conditions of illness in children, preventing progress in school or likely to be damaging to efficiency in future years, should not be put on the same basis as these more common educational diseases." It is said that this would not mean any great increase in the numbers to be treated. It is claimed that the treatment given is not in the nature of charitable relief, that the Council pays the hospitals so well that neither hospital nor Council are in any way giving charity. The Council pays 2s. a head for establishment charges, which is said to be sufficient to cover the cost, and the report continues:

> For every medical practitioner for each half-day per week spent on the treatment, a payment of £50 per annum is made. This is a reasonable and sufficient scale of payment, and as the sum is paid by the Council purely for professional work, no medical man should under any excuse submit to being sweated into doing the work for less. Evidently, then, neither hospitals nor medical men are giving any charitable service, although hospital almoners are supposed to investigate the fitness of the cases for charitable aid. On the other hand the Council is compelled under the Act of 1909 to charge up to the full cost of any medical treatment. Power is, however, given to make remissions, and the Care Committees have had remissions suggested in cases of poverty in accordance with the following scale:

The scale is too long to quote here, but we find that what is called the full charge for ringworm is 3s. per attendance; for ear, nose, and throat 1s. 8d.; and for eye cases 1s. 4d. The "standard family" is taken as two parents and four children, and the net income on which remissions are calculated is not the full wages, but the amount available after deducting rent "and other regular outgoings as payment for sick club, insurance, and fares to and from work." The term "regular outgoings" is so elastic that it may mean anything up to as much as 20s. or more per week. Thus, when 20s. is named as the net income, the weekly wages may be as much as £2 a week, and a standard family with this income receives such a remission from the full charges that only 4d. is charged for each attendance for any of the complaints named, and apparently even this may be remitted for travelling expenses to and from the hospital. If this is not giving charity where it is not needed, it is not far removed from it. Moreover, a standard family does not pay the full charge of 3s. per attendance for ringworm treatment until the income, after deducting the regular outgoings, amounts to 37s. 6d. a week; in other words, a standard family may be receiving in wages as much as £2 10s. or even £3 a week before it has to pay the full charge for ringworm of 3s. per attendance. It would be interesting to know how much is actually recovered from parents who could quite well afford to pay ordinary fees to general practitioners.

We are further informed that "with very few exceptions all the hospitals have been willing to make agreements with the Council, the most notable exceptions being certain large hospitals like St. Bartholomew's, Guy's, St. Thomas's, Middlesex, and Westminster." Certain general terms enter into the agreements with all the hospitals, for which reference must be made to the report, and it is claimed that the scheme is "perhaps the best experimental scheme that could be devised to co-ordinate the services of the hospitals." The following quotations are noteworthy:

> Obvious extensions to be called for are that any disease or ailment may be relieved, and that the Council's voucher should be honoured for payment when received from any properly recognized and efficient institution.
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> *Special Districts.*—In certain districts too remote from any efficient institutions, namely, Hampstead, Norwood, Wandsworth, and Woolwich, negotiations are proceeding between committees of medical men representing the local profession and the Council as to the establishment by the medical men at their own expense of centres for treatment, the Council treating these professional committees on the same financial basis as it does the charities, namely, the payment of an establishment charge of 2s. per head and a payment for professional services of £50 per annum for each half-day weekly given by a medical practitioner. It appears scarcely possible for such an undertaking to be made self-supporting with less than 1,800 to 2,000 cases yearly. A capital outlay will also be required at first, which is not required in connexion with the charities. Considering these facts a reasonable suggestion has been made to help further by granting the services of a school nurse for half her time or more in the work of each treatment centre. With the provision of centres for treatment in these districts the provision for the London area under this scheme will be complete. A full year's working of the system now in its early stages must be made before it can be fully appreciated. By that time the various co-ordinations will have been made, causes of friction overcome, and possibly an effective working method evolved.

The routine adopted for obtaining treatment is that, after examination by the school doctor, a card is given to the parents on which the defect is noted for which treatment is advised. If the parents fail to take steps, a printed letter is sent calling attention to the need for treatment. If treatment is still not obtainable, arrangements are made under the Council's scheme, and a card is given to be taken to the proper hospital, which retains it as a voucher for payment by the Council. A table is given in the report showing the results of the scheme in the cases of 5,000 children examined during five months. Of this number, 1,528 received satisfactory treatment and 497 were still under treatment. Of the remainder, 118 had received unsatisfactory treatment, 45 had been discharged though still needing treatment, 104 had gone to a hospital or a doctor, but had not been treated, and all the rest had either not been attended to at all—for various reasons—or had left and were not accounted for, or in some other way were not satisfactory. The following comments are made on these results:

> From the reports of the school doctors the treatment obtained by the children seems very variable in amount and quality. It would be unjust to say more at present, but, allowing for all kinds of mental refraction, and knowing the strange possibilities of stories as related by patients, one is forced to conclude that the arrangements for the comfort and convenience of out-patients are often unsatisfactory, and that the treatment given is not always done with the thoroughness and skill that is usually credited. The out-patient departments are probably the worst-managed parts of these great institutions, and would be well worth some detailed consideration on the part of those who control large charitable funds. Speaking generally from the reports of the school doctors, the ophthalmic work is the only work uniformly well done; it has improved in recent years, but even now instances are encountered of glasses being prescribed for children in quite complicated cases apparently without measurement of refraction having been attempted either with or without mydriatic.
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> Efforts to prevent hospital abuse show that these may become a farce in practice. One hospital, whose doors are only open to patients recommended by medical men, does not acknowledge the cards sent out from the schools, and patients with such cards must first go to some neighbouring practitioner. What has happened is that he copies the statement of "affection of eyes," or whatever it may be, from the school advice card on to a private visiting card, charges sixpence, and the hospital doors are opened, but if the patient is too poor to pay the sixpence, he is refused the benefits of the hospital. The suggestion put forward by Branches of the British Medical Association that all school cases should first be seen by a medical practitioner, and by him be certified to the education authority as suitable for treatment at their expense, would be as unworkable as the scheme of this hospital. If the whole of the children, and not merely a percentage of those requiring treatment, are to have it, the way must be made easy and not difficult. That is the whole end of our hospital system of medical treatment. No case requiring treatment should remain untreated, and artificial restrictions standing in the way of medical treatment,

even in the interest of members of the medical profession, are inadmissible as being against the public interest, and ultimately the interests of the profession itself.

With regard to special diseases, we are told that in spite of much money spent, ringworm has not been materially reduced. During the year 3,019 suspected cases were microscopically examined, and 2,343 were found to be ringworm, 76 being the large-spored form. The treatment followed in the majority is regarded as unsatisfactory, and often only make-belief. Cases had been certified as mere "scurfiness," or were said to have been discharged as cured by hospitals or private doctors when they were still highly infectious. For example, out of 186 cases certified as free and fit for school, 179 were still found to have ringworm, and one favus, only 6 being actually free. Favus in London is practically confined to alien races. At the special favus school opened in 1906 epilation by Roentgen rays was after a time commenced, and has been so successful that the school was closed as a teaching centre in June last year. It had fully justified its existence, as it had cleared the district of cases.

For suppurating ears two nurses were engaged to visit patients at their homes, acting solely under medical instructions. The results are described as a "disheartening failure," as more than half the cases never received treatment. Dr. Kerr thinks it would be best and would involve but little extra cost for the nurses to treat the cases at the schools. Up to the end of the year each case cured had cost £2 5s.

Infectious Diseases.

Great stress is laid on the need for co-operation between the medical officer of health and the school medical officer, and it is suggested that it would often save time if, when children are excluded from school, the medical officer of health would notify the school medical officer directly instead of through the teachers. There has been a great decline in the incidence of scarlatina and diphtheria during the year, though measles has been in excess of the normal. The question of closure of schools for measles and whooping-cough has been fully considered, and it was thought to be irrational to exclude children who had had these diseases simply because there was an epidemic. The plan has therefore been tried with success of only excluding during an epidemic the "unprotected" children—of course, taking every precaution against actual infecting cases. Also, children under 5—that is, below the age of compulsory attendance—have been excluded during epidemics. In the present mild form of scarlatina many cases are only discovered when children are found peeling in school. In such cases the teacher is instructed to keep a list of absentees and carefully to inquire on their return as to any sickness or sore-throat, but the classroom is not closed, nor is any disinfection or special cleansing deemed to be necessary, as secondary cases very seldom occur even though the peeling child has been in constant attendance. From careful observation of a number of cases, the infectivity of peeling cases is considered to be very slight, and routine disinfection is not done. A table is given to show that school influence in causing infection can be detected in less than 20 per cent. of cases, while more than half are infected out of school. The presence of "carrier cases" was suspected in twenty-five schools where diphtheria occurred, and out of 3,009 cultures taken, the diphtheria bacillus was found in 122, that is, 4.5 per cent. In every case when the carriers were excluded, fresh cases ceased to occur. Special inquiries at Battersea and elsewhere seemed to show that school attendance rather tends to hinder the spread of scarlatina and diphtheria, and that the attention of the sanitarian should rather be given to prevent infection in families, houses, courts, and streets. Woolwich and Lewisham had by far the highest percentage of scarlatina, while Lewisham was the worst for diphtheria, Hammersmith for measles, and Paddington and Hampstead for whooping-cough. On the other hand, the City and Finsbury had the least percentage of scarlatina, Holborn the least diphtheria, Stoke Newington and Stepney the least measles, and Chelsea the least whooping-cough. Prima facie, it would appear that there is 25 per cent. higher case-rate for scarlatina in the total child population aged 3 to 14, than in the school population, and 30 per cent. higher for diphtheria.

Special Schools.

In the special schools for the blind, deaf, mental and physical defectives there is provision for about 10,000 children in London, apart from industrial schools and reformatories. The regulations of the Board of Education provide that each child in a special school shall be medically examined once a year to ascertain whether it is fit for an ordinary school, or whether it is so defective as to be unable to profit by any education. There are now 6,764 mental defectives on the rolls, and some interesting facts are given as to their attainments after attendance at the special schools. The provision for epileptics is still unsatisfactory. The Council retains a total of 50 places at Chalfont and Lingfield, though the number returned as epileptics suitable for special schools during the year was 490, and provision is needed for an annual demand of about 140.

For the blind there are 9 schools, including 6 day and 3 residential schools. In addition, children with high degrees of myopia are now being taught in an experimental class for the semi-blind. In this class no books, paper, pens, or pencils are used, but large blackboards round the classroom are used by the teacher, and all work likely to be dangerous to the sight is avoided.

For the deaf there are 10 schools, with a roll of 616, and it is proposed to establish a school for the semi-deaf. Out of 500 deaf children, 229 were congenital cases, 225 acquired, and 46 doubtful. Meningitis and convulsions were the cause of 9.3 per cent., while measles accounted for nearly twice as many cases as scarlatina. Full details are given as to the causes, physical conditions, and treatment of the ear diseases met with.

An interesting and valuable account is given of investigations on the influence of heredity in the production of physical defects, especially deafness, blindness, and mental defects. Reference is made to the tuberculosis school which the Council proposes to establish and maintain for three years. Phthisis is comparatively rare among the children, not exceeding 3 per 1,000, but the results of tubercle are seen in nearly half the cases in the cripple schools. The new tuberculosis school will be for children suffering from or predisposed to tubercle or who have been discharged from sanatoriums. It promises to be one of the most fruitful experiments under the Council, as it is hoped through it to introduce favourable modifications of home environment. The continuation school work in hygiene, infant care, and home nursing will also tend in the same direction.

It should be noted that the report only deals with matters up to the end of 1909. Many modifications have been proposed in inspection and treatment during the present year, most of which have been noticed from time to time in our London Correspondence columns.

SOCIETY OF MEMBERS OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

An extraordinary general meeting was held at head quarters, 1, Upper Montague Street, Russell Square, W.C., on Tuesday, July 26th, 1910. By kind permission of the British Medical Association notices thereof had been posted at the University of London, where the members of the society and others attending the Annual General Meeting might see them. Dr. Joseph Smith, the President, occupied the chair. Both Fellows and Members of the College were present.

The President delivered a short address on the past history of the society and its efforts to reform the administration of College affairs.

Drs. Brindley James and Dickinson followed with remarks on the present aims and objects of the society, which are:

(*a*) To arouse and maintain among Members of the Royal College of Surgeons of England a permanent interest in their College by obtaining for them a share in its management.

(*b*) To promote an amendment of the charters of the College which shall permit the Members to take part in the election of the governing body.

(*c*) While seeking primarily to further the interests of Members, to co-operate with the Fellows in obtaining such reforms as are possible under the present charters.

(*d*) Generally to promote the true welfare of the Corporation by bringing the Council, Fellows, and Members into harmonious action.

Dr. BRINDLEY JAMES said their first object, naturally and rightly, was to rouse a feeling amongst the Members with regard to their representation on the Council of the College, and that an earnest desire for this must be manifest before they could expect the public support necessary for the passage of a new charter through Parliament. It was a difficult task to dispel the apathy prevailing amongst the members of the College, and to make them acquire a lively interest in its well-being. He maintained that this apathy was largely due to Members being refused a share in the administration of the College, but that it would be at once and for ever dispelled, if a vote for the Council were the privilege of every Member.

Dr. W. G. DICKINSON contended that nothing in the declared objects of the Society, which had been in existence over fifteen years, was inimical to the best interests of the College. He maintained that up to now the College was not what it ought to be, and might be, in its relations with its 14,000 members. It was unlikely that the policy of the College as dictated by a Council composed solely of twenty-four Fellows in consulting practice, should always be acceptable to those Fellows and Members in general practice. Dr. Dickinson thought that the attitude of the Council was well described in the words of a recent leading article of the BRITISH MEDICAL JOURNAL: they are "sitting aloft like the gods of Olympus, and looking down on the struggles of mankind, without doing anything to help them out of their difficulties." It was this sad condition of affairs, he declared, which the society wished to improve by placing eight members on the Council as representative of those in whom the charter of 1800 vested the whole property of the College. The charter of 1843, which created the Fellows, conferred upon them no rights which conflicted with those given to the Members by the former charter.

The HONORARY SECRETARY (Dr. S. C. Lawrence) reminded those present that a number of Fellows subscribed to the society, and sympathized with its objects. Further, that as many of the present Council were known to be of the same mind, it was probable that at no distant date the society would be able to rejoice in the success of its persevering efforts for a just share in the administration of the College affairs being willingly given to its Members.

THE ROYAL COMMISSION ON THE POOR LAWS AND RELIEF OF DISTRESS.

ANOTHER appendix[1] (vol. xxix) to the Royal Commission on the Poor Laws has just been issued. The appendix deals with the replies of the clergy of the Church of Scotland in connexion with the extent and intensity of poverty in various parts of Scotland. On April 25th, 1907, the Royal Commission addressed to the Moderator of the General Assembly of the Church of Scotland a letter to the effect that the Royal Commission was anxious to avail itself of the great experience possessed in the matter by the clergy of the Church of Scotland. The letter was accompanied by a list of questions which indicated the line of inquiry, and the matter was dealt with by the Committee on Church Interests. Circular letters were addressed to the ministers of all parishes setting forth particulars of the scope and nature of the inquiry, and the information thus obtained is contained in the appendix which has just been published.

Poverty not on the Increase.

To the first query—which asked the extent of poverty in the parish, whether it was increasing in intensity, and whether the minister to whom the query was addressed could point to any special causes, moral or economic, to which it was due—those of the answers which are in the negative are equal to about 79 per cent. of the whole. About 13 per cent. answer that there is much poverty in the parish. These are situated about one-third in the towns and one-third in the Highland counties; the remaining one-third seem fairly distributed over other parts of the country.

[1] Royal Commission on the Poor Laws and Relief of Distress. Appendix vol. xxix. Church of Scotland. Report from General Assembly's Committee on Church Interests, with appendix. London: Eyre and Spottiswoode, Limited. 1910. (Price 1s.)

Causes of Poverty.

Among the moral causes, those which are most frequently mentioned is drunkenness, gambling, and betting, which in some districts are reported to be increasing; early marriages, particularly in large centres; want of ambition and weakness of will; desertion of children by parents.

Among the causes of an economic nature, there came most prominently to notice thriftlessness. The wages ruling for some classes of employment are often not sufficient to do more than barely make ends meet, but in very many instances where good wages are earned and when it is practicable there is a want of effort to provide for sickness, old age, and contingent claims.

The Want of Steady Employment.

It is stated that one effect of recent legislation has been in some callings, such as engineering and shipbuilding, to make it almost impossible for elderly workmen to find employment. The insurance companies will not insure workmen above a certain age, and, as employers do not care themselves to undertake the risks involved, these men are discharged.

The Housing Question.

Depression of trade has seriously affected many industries, while in many rural parishes and smaller towns there is a want of industries to provide employment for the population. In the large cities the system of farming-out houses and the condition of many of the buildings in which the poorest class reside conduce in many ways to the existence of misery and distress. The poorest pay, in proportion, very high rents and for accommodation of the most inferior description.

Other Causes of Poverty.

A good deal of the existing poverty is attributed to sickness, infirmity, old age, and inability to work, and among aged single women the two latter causes operate largely. Depopulation, migration, and emigration are indirectly the cause of a certain amount of poverty particularly in the Highlands. The young move to the South or go abroad, and the old people on becoming unfit for work sometimes become chargeable to the parish.

Administration of Charitable Assistance.

Query 2 asked the methods employed in the administration of charitable assistance; and it is stated that mention fails to be made in the returns of the numerous funds, gifted or bequeathed, for the benefit of the poor in particular parishes. The amount of charity and charitable work undertaken by the various churches and parishes is very large and wide-spread.

Unrelieved Distress.

More than 90 per cent. of the replies to query 3—which asked for instances where any appreciable amount of (unrelieved) distress was due to the reluctance of destitute persons to resort to Poor Law relief—are to the effect that no such unrelieved distress exists; but in some returns instances are recorded.

Supplemental Poor Law Relief.

To query 4—asking for particulars whether there is any appreciable amount of distress due to the amount of Poor Law relief being inadequate—a very large proportion of the returns stated that to this cause there is no appreciable amount of distress due, but in many instances mention is made that such distress would exist but for the fact that the relief given is supplemented in various ways by the charity of churches and other agencies, and much private assistance by neighbours and friends.

Overlapping in Populous Centres.

Query 5 referred to the question of overlapping, and the report states that the parishes in which it appears from the returns that needless overlapping between various forms of charity exists to an extent more or less serious are to be found almost entirely in centres of large population. Instances of overlapping between charity and the Poor Law are rare. In private charity possibly there is more overlapping than in the other form.

THE BRUSSELS EXHIBITION.

[The following account of the medical and surgical departments of the Brussels International Exhibition was written before the disastrous fire which destroyed the greater part of it. The exhibitors, especially the British, are showing the greatest energy in renewing the material they had on show.]

Compared with previous international exhibitions, the Brussels Exhibition, though including the gardens it covers an area of more than 200 acres, may be considered a small one. What it lacks in size, however, is amply compensated by the excellence of the exhibits. This is more especially noticeable in the portions of the exhibition allotted to the United Kingdom. The exhibits are arranged under 21 groups and 128 classes. Group III, Class 16, may be described as the Medical and Surgical Class.

British Exhibits.

In this class the Birmingham Dental Supply and Manufacturing Company has a very fine exhibit of artificial teeth of all sizes and all shades from white to dark brown, these latter to match teeth discoloured by smoking. They also show platinum pin-teeth. They state that the teeth are made from a mineral ground and then baked, and the teeth have a very natural appearance. For this exhibit a gold medal was awarded.

Messrs. Brady and Martin (Newcastle-on-Tyne) have an interesting and varied exhibit. They show cases of surgical and dental instruments, a compact high-pressure steam sterilizer, and Dr. James Mackenzie's polygraph for giving simultaneous graphic records of dissimilar pulsating areas. For their exhibit Messrs. Brady and Martin were awarded a *diplôme d'honneur*. A detailed description of Messrs. Burroughs, Wellcome, and Co.'s exhibit would occupy too much space; suffice it to say that it was in keeping with their reputation, and they were awarded a Grand Prix.

There are some very fine exhibits of surgical instruments and hospital furniture. Messrs. Down Brothers' installation was the largest and most complete in the exhibition, and illustrated the advances made during recent years in instruments and appliances used in surgery. For their exhibit they have received the highest award—a Grand Prix. They have previously been awarded a Grand Prize at the International Exhibition at Paris in 1900. Messrs. Down Brothers state that the whole of the instruments in their exhibit were designed in England, and were manufactured in their own workshops.

Messrs. William Gowlland, Limited, of Croydon, have a very complete collection of lenses and mirrors, such as oculists' sight testing instruments, ophthalmoscopes, laryngoscopes, etc., for which they claim great accuracy of design and construction. The firm has obtained an award of a Gold Medal.

For his very fine pharmaceutical preparations of all kinds, and as an acknowledgement of the labour involved in their production, and the great benefit to the profession and the public from the information contained in the *Extra-Pharmacopoeia*, the jury awarded a Grand Prix to William Martindale, Ph.D. Subsequently each juror was presented with a copy of the *Extra-Pharmacopoeia*.

A Gold Medal was awarded to The Tintometer, Limited, for their exhibit of colour standards and apparatus for the determination of colour values for their pathological apparatus for diagnosing diseases by means of blood characteristics.

The Wellcome Physiological Research Laboratories, Herne Hill, show a remarkable series of preparations—serums, vaccines, and pathogenic organisms, and illustrations of the methods of their preparation. This will be the sixth Grand Prix that has been awarded to them.

There is no operation in medicine or surgery which is more unscientific and more susceptible of improvement than the manner in which chloroform is very frequently administered. Thanks to a great extent to the work of a committee promoted by the British Medical Association, an instrument has been designed by Mr. A. G. Vernon Harcourt, F.R.S., and manufactured by John J. Griffin and Sons, Limited, which will enable chloroform to be administered in a safer and more economical manner.

It is claimed for this instrument that an exact and constant percentage of chloroform vapour can be administered; that there is a great saving of chloroform; that it is almost impossible to give a fatal dose; that the anaesthesia is more complete and calmer, and that the tendency to vomiting is greatly diminished. Messrs. Griffin were awarded a Grand Prix, and Mr. A. G. Vernon Harcourt a gold medal, as collaborator.

French Exhibits.

Of the French exhibitors, the installation of Messrs. Mathieu is very complete; it includes an operating table designed by Dr. Doyen, in which by a pedal movement the back of the patient can be raised from the table; also a very ingenious abdominal retractor for pelvic operations. This exhibit fully deserves the Grand Prix which has been awarded. Messrs. Mathieu also show a fine assortment of osteotomes and other bone instruments. Of the excellence of Messrs. Luer's instruments the writer can speak from long experience, and the present firm of Wulfing-Luer maintains its high reputation, and has been awarded a Grand Prix. Messrs. Gaillard, Bouissereu, and Porget have very fine exhibits of catheters and similar instruments.

The only important Italian installation is that of the Istituto Sieroterapico Milanese, which has a very complete collection of serum-therapeutic preparations, and exhibits photographs of the building and of the laboratories in which the various serums are prepared.

The Swiss exhibit is small; there is only one exhibitor of note—Schaerer, who gets a Grand Prix.

German Exhibits.

The exhibits in Class 16 in the German Section attain a very high standard; the reputation of the German makers of instruments and hospital furniture is world-wide, and their exhibits fully justify their reputation, and the large number of Grands Prix which have been awarded. H. Windler of Berlin has a very complete exhibit of surgical instruments unsurpassed in variety, ingenuity, and workmanship. Messrs. Hartmann seem to confine their attention to surgical dressings of which they show a large variety. The fact that they employ more than 1,000 workpeople in their preparation justifies their claim to be the largest house in the world in their speciality.

Kratz of Frankfort, in addition to a fine exhibit of surgical instruments, seems to have a reputation of surgical and hypodermic needles and shows the various steps in the manufacture of the latter. Müller of Wiesbaden deservedly obtains a Grand Prix for the perfection and variety of his exhibit of glass eyes.

Weber and Hampel, Conrad Lincke and Schneider of Berlin, appear to confine their attention chiefly to instruments and furniture required by dentists. E. A. Lentz has a fine installation of bacteriological apparatus worthy of his reputation and of the Grand Prix awarded. Emil Kohm of Carlsruhe receives a Grand Prix for his exhibit of thermocauteries and other instruments in platinum and iridium. The microscopes and microscopic apparatus of Zeiss of Jena are beyond criticism and beyond praise, the installation fully justified his world-wide reputation.

Belgian Exhibits.

Compared with its neighbours France and Germany, the Belgian exhibit in Class 16 is small, as indeed would be expected. There are, however, several very interesting exhibits. From a close inspection of photographs and plans, the Sanatorium de la Hulpe at Brussels seems to be in advance of many institutions of the kind. It is situated in a parc of 10 hectares, was built and is maintained by public subscription. It contains 60 male beds, and cost £220 a bed.

Dr. Simon (Brussels) shows an improved chloroform inhaler, something similar to Harcourt's in principle. The Manufacture Belge de Gembloux has a fine exhibit of theatre furniture, and a metal and glass instrument cupboard of improved construction. Xavier Busset (Vilvorde) shows boxes for sterilizing and sterilized dressings in aluminium. A useful and ingenious bed-rest and table called the "Sleeping Chair," which can be fixed rigidly to a bedstead, can be removed in a minute, and is adaptable to beds of vary width, is shown by Honoré Deprès (Brussels). The exhibit of surgical instruments of C. Vandendaelen and Son, though not extensive, is excellent in design and construction. The most interesting apparatus, however, in the Belgian exhibit in Class 16 is Dr. Mayer's inhaler for administering anaesthetics under pressure. This inhaler, which has been simplified and perfected during

the last two years, is of special value in operations necessitating intrathoracic operations, as by its use collapse of the lung and consequent pneumothorax do not occur. This instrument is adapted for either chloroform or ether, and the pressure can be varied as required.

THE PLAGUE.

Prevalence of the Disease.

India.

The deaths from plague in India during the first six months of 1910 were distributed as follows:

January	51,437
February	67,426
March	110,415
April	77,961
May	42,347
June	11,046
Total for half year	360,632

The areas in which plague has mostly prevailed and the mortality caused by the disease during the first six months of 1910 were:

Bombay Presidency, 16,881; Bengal, 34,388; United Provinces, 119,507; Punjab, 132,490; Central Provinces, 17,750; Rajputana, 28,152; Burma, 5,953. As in former years the Punjab has suffered more severely than any other district of India.

The deaths from plague in all India for the weeks ended July 2nd, 9th, 16th, and 23rd amounted to 891, 717, 561, 554. During the last week in July Bombay headed the list of plague cases, and the Punjab recorded the lowest mortality from plague.

China.

During the first three months of 1910 no cases of plague were reported in China. In Canton and the neighbouring district a slight outbreak occurred in May. In June, cases of plague were reported from Swatow. In the most southerly portions of China a severe outbreak of plague occurred in April; the parts especially affected were those in and around Chao Yang, Hoikow, and Hainan.

Hong Kong.

From April 23rd to August 13th the fresh cases of plague in Hong Kong numbered 27, and the deaths from the disease amounted to 25. Since plague first appeared in Hong Kong in 1894 the disease has recurred annually from about the middle of the month of April to about the middle of August. The outbreak during the current year has been the most mild during the sixteen years since the disease first appeared.

Japan.

Plague has been less severe this year in Japan than during any previously recorded year. A few cases occurred in May and June in Osaka, 10 in all, with 4 deaths.

Persia.

From March 25th, 1910, when the present outbreak began, until June 4th, the number of plague attacks recorded numbered 55, and the deaths from the disease amounted to 42. Bushire has been the principal centre of plague.

Turkey in Asia.

At Djedda (Port of Mecca) 34 deaths from plague occurred in May. In Lohaia and neighbourhood (Red Sea coast), between April 1st and May 24th, 63 cases reported, with 51 deaths from plague. At Bassra 2 cases and 1 death recorded in April.

New Zealand.

A case of plague reported from Auckland on May 23rd.

Straits Settlements.

During May isolated cases of plague recorded.

Mauritius.

From January 1st to August 17th, 1910, the fresh cases of plague numbered 135, and the deaths from the disease 113. The worst season for plague was during the first six weeks of 1910.

Tunis.

Three cases of plague (imported ?) were recorded in the month of June in the port of Tunis.

Egypt.

From January 1st to June 30th, 1910, there were 849 cases of plague recorded through Egypt. The towns and districts chiefly affected were Alexandria, Cairo, Port Said, Beni Souef, Fayoum, Assouan (1 case), Tantah, Deirut, Galiub, Minia, Kena, and El Tor. Although widely spread in Egypt, plague was nowhere severe.

Russia.

In the Astrachan district plague prevailed during the winter of 1909–10, when between December 1st and March 1st 93 deaths were recorded. During the spring and summer a few cases have been recorded. The last report, June 26th to July 13th, states that during that period there were 13 fresh cases and 12 deaths from the disease. In the Ural districts plague prevailed during the winter, but it has practically disappeared during the summer.

South America.

Brazil.—In Bahia, during April, 3 cases; 3 deaths.
Chile.—In Pisagua, during April and May, 14 cases; 4 deaths.
Ecuador.—At Guayaquil, several cases during May.
Venezuela.—At Puerto Cabello, occasional cases.
Peru.—During February, May, and April, 12 cases of plague reported.

Trinidad.

During April, 3 deaths from plague recorded.

LITERARY NOTES.

The September number of *School Hygiene*, which will be ready on September 1st, is a special Congress number, containing a full descriptive account of the Third International Congress on School Hygiene held in Paris from August 2nd to 7th. The inaugural speech of the President, Dr. Mattieu, will be given in full; as are also the addresses to the Congress by Dr. J. Kerr, chief School Medical Officer to the London County Council, "The Doctor's Work in the Schools," and by Dr. Chotzen of Breslau, "Instruction on Sex." Descriptive accounts of the proceedings in the eleven sections, a notice of the Exhibition, a special report of the gymnastic and dancing displays by English and Continental classes, make up a number which contains the only complete account of the Congress published in this country.

The Edinburgh Pen and Pencil Club, in pursuance of its scheme of identifying the houses occupied by famous citizens, has, by permission of the owners, cut an inscription on the house in 23, Rutland Street, Edinburgh, occupied by Dr. John Brown, the author of *Rab and His Friends*. The inscription runs: "Dr. John Brown, author of 'Rab and His Friends,' lived in this house from 1850 to 1882."

For the past four years Professor John Edgar has been engaged preparing a publication on the Great Pyramid of Gizah in Egypt, entitled *Great Pyramid Passages*, in two volumes. In this work he endeavours to show, among other things, how the Great Pyramid, by means of symbolisms and measurements, corroborates the philosophy and prophetic times and seasons of the Scriptural plan of salvation. Last summer he, in company with his brother Morton Edgar, visited Egypt and Palestine, and took careful observations and measurements in the interior of the Great Pyramid. They secured a large number of interesting, and in some cases unique, photographs, most of which are reproduced in the first volume. We understand that the first volume, which contains 164 plates, and is printed on the best art paper, will be published by the end of September. Copies may be procured by applying direct to Morton Edgar, 224, West Regent Street, Glasgow; or to the Watch Tower Bible and Tract Society, 24, Eversholt Street, London, N.W. The price is 5s. 6d. It may be added that in the year 1908 Professor Edgar published a brochure entitled, "Where are the Dead?" as to which we have received several inquiries. It is written in an interesting style, and may be procured for 3d. at the above addresses.

St. Louis, its History and Ideals, is an illustrated booklet prepared by Dr. Philip Skrainka for the sixty-first annual session of the American Medical Association held in June last. It contains an account of the early history of St. Louis and a description of its streets, buildings, parks and public gardens, the art museum and art schools, its medical schools, hospitals and charitable institutions, universities, schools and libraries. The first medical school dates from 1840; the second from the following year. Dr. William Beaumont, whose observations on Saint Martin form the basis of our knowledge of the physiology of the stomach, was a lecturer in the former. There are now three medical schools; two "under the aegis of universities."

In *La Clinique* for August 12th, Dr. Leon Mac-Auliffe gives an account of Dr. Poumiès de la Siboutie, which is interesting as throwing a vivid light on medical teaching in Paris in the early part of last century. Born in Périgord in 1789, Poumiès began his medical studies in Paris in 1810. One of the things that struck him most among his fellow students was the great proportion of lame, hunchback, or otherwise deformed men among them. This he attributes to the fact that conscription and the military schools had taken the best made and most

vigorous, leaving at home the weaklings who were deemed unfit for service. This drain on the strong has left an abiding influence on the male population of France; to such an extent is this the case, that the minimum of height for the army has steadily had to be lowered. The clinical instruction in midwifery was given under somewhat primitive conditions. When a woman was about to be delivered she was brought into the theatre, before the students, and placed well in the middle of the room, where she could be seen by all. She was, however, treated with all possible kindness. The professor demonstrated the different stages of parturition. When all was over the woman was at once taken in a cab to her home, where she was looked after till her recovery. Poumiès was house-surgeon to Dupuytren, whom he describes as a man of consummate practical ability, though imperfectly acquainted with the science of his time. "What he did not know, he guessed or invented; however serious or unusual might be the circumstances with which he had to deal, he was never at a loss."

Dr. Johnson, as every reader of Boswell knows, had a stroke of apoplexy in 1783 of which he gave an account in a letter to Mrs. Thrale. Waking up in the night he says he felt a confusion and indistinctness in his head which he thought lasted about half a minute. "I was alarmed," he says, "and prayed God that however he might afflict my body, he would spare my understanding." This prayer, he goes on to say, that he might try the integrity of his faculties, he made in Latin verse. The verses are given in his *Works* as follows:

Nocte, inter 16 ex 17 Junii, 1783,
Summe pater, quodcunque tuum de corpore Numen
Hoc statuat, precibus Christus adesse velit:
Ingenio parcas, nec sit mihi culpa rogasse,
Qua solum potero parte placere tibi.

"The lines," Johnson continues, "were not very good, but I knew them not to be very good; I made them easily and concluded myself to be unimpaired in my faculties." It is a curious coincidence that Sir Walter Scott adopted a similar method of testing the integrity of his mental faculties. In the *Memories of Sir Walter Scott* by James Skene, published not long ago, an account of his sufferings from gall stones is given. Scott had for many years before his death a foreboding of failing intellectual power. During his illness the large quantities of laudanum which he took doubtless caused mental confusion. This made his fears more acute. Skene says:

In the progress of his illness upon this occasion he asked me one day to read him a short ballad of Bürger in German, that he might amuse himself in translating it, which was accordingly done, and he put up the translation in his pocket-book, and refused to let me see it, saying it was not worth reading. However, some months after, when he began to be decidedly convalescent, he reminded me of the translation, and taking it out of his pocket-book he said he had his reasons both for writing it and for refusing to show what he had written, and that he now felt more nervous than he could express in putting it to the use he intended, which was as a test of the state of his mind during his late illness, for that he had had frequent misgivings in the progress of it that his faculties were giving way, and might never again be recovered. "Now, I really am not bold enough," he said, "to be my own executioner; do you now take the manuscript, and after I have read the original, read it aloud, and let it pronounce the sentence of sanity or imbecility as it may chance." Accordingly this singular experiment was put to the test. Sir Walter read his part, and turning his head aside desired me to go on, and upon my reading the translation, which really was very good, cast a most whimsical glance from under his heavy eyebrows, "Well, is Richard himself again?" There was no doubt of it. I wanted to pocket the manuscript, but he would not suffer me; he said it had answered its end, and must not be urged further.

In fact, adds Skene, it was the use of laudanum which gave birth to all these apprehensions, and he was now satisfied of the truth of this. The failure of his mind, Scott said, was the only dread that preyed upon his spirits, for he had no reason to trust much to the stability of a frame of body which had had to struggle through such a state of feebleness as his had in infancy.

In the current number of the *Archives de l'Institut Pasteur*, MM. H. Camussi and Dr. Ahmed Chérif contribute an interesting article on the treatment of hydrophobia practised by the Arabian physicians. The majority of Mussulmans believe that the prophet himself first described the disease and how it should be treated. Among the traditional doctrines handed down from him which were not consigned to writing till after his death, he gives a very graphic and fairly accurate description of a rabid dog. He puts the incubation period after a bite in the dog itself at from one to two weeks to six months. The following is given as a diagnostic test:

When it happens that one of these animals has bitten some one and there is doubt as to the condition of the victim and the contingencies to be feared, it is sufficient, in order to acquire complete certainty on this point, to steep a piece of bread in the blood that flows from the bite and to throw it to another dog. If this dog eats it up the dog which inflicted the bite is sound, and the bitten man has nothing to fear. On the other hand, should the dog refuse the bread the biter is rabid, and the fatal consequences of the disease are to be feared for the victim unless they are prevented by appropriate treatment. For this it is indispensable to cut out the bitten part, and to draw out the infected blood by dry cupping. The mouth of the wound must also be kept clean, so that the vitiated humours, pus, watery and other humours engendered by the poison may find ready issue. It is necessary that the person who aspires the air of the cups should be very careful, before doing so, to anoint his mouth and lips with a fatty body, oil or pomade.

These traditions of the Prophet are not accepted as authentic by all Mohammedans. However this may be, the description of the disease and the treatment recommended resemble those given by the Greek and Latin authors. This may be explained by the fact that in the time of the prophet, Jewish or Nestorian physicians, trained in the Greek schools of the East, or at Alexandria, who had for the most part been exiled on account of religion, practised their art in Mecca and the principal cities of Asia. In another of these traditional sayings the prophet is represented as teaching that when a dog licks a domestic utensil, it should be washed seven times, once with earth. The reason of this is said by the commentators to be that the poison is contained in the foam that comes from the dog's mouth. Hence, if a dog licks or drinks out of a vessel, the poison passes from the frothy mucus to the liquid, and from that to the vase itself in which it is distributed. The mucus being liquid and of a watery nature the poison from the vessel may enter the human body through the least scratch, and act just as if it had been directly introduced by a bite. Rhazes recommends cauterization and the use of various purgatives—cantharides given internally, gentian, and other drugs. He also held human hair steeped in vinegar and applied on the bite to be a sov'ran remedy. Others recommended that the poison should be counteracted by applications of pounded garlic or onion. Baths were also considered to be useful. Drinks containing crushed or burnt river crabs, which were thought to be less salt than those taken from the sea, were prescribed. The patient was made to drink through a tube introduced into his mouth as far as the root of the tongue. Avicenna knew that the wolf and the jackal are liable to rabies as well as the dog. His description of the disease in man is highly fantastic, one of the symptoms being the expulsion in the urine of "fragments of flesh, of strange form, which might be taken for animals, for instance, tiny dogs." Pliny describes some curious methods of treatment. In the twenty-ninth book of Philemon Holland's translation we find the following:

For the biting of a mad dog take the ashes of a dog's head burnt, and apply it to the sore, it wil saue the Patient from that symptome of being afraid of water; which is incident to such as be so bitten. [And now by occasion of speech know thus much once for all, That all things which are to be calcined require one and the same manner of burning, that is to say, within a new earthen pot neuer occupied before, well luted ouer with strong cley, and so set into an ouen or furnace vntill such time as the contents be calcined.] The said ashes made of a Dog's head is singular good likewise to be drunke in the same case: wherfore some haue given counsell to eat also a dog's head. Others seeke after the wormes that breed in the carkasse of a dead dog, and hang the same fast about the necke or arme of the party that is bitten: or els they lap within a cloath some of the menstrual blood of a woman, and put it vnder the cup or pots bottome out of which the patient drinketh. And there be some againe who burn the haires of the same dogs taile, and conueigh the ashes handsomely in some tent of lint into the wound. Moreouer it is commonly said, That as many as have a Dogges head about them, no other Doggs will come neere to do them any harme. In like manner, if a man carry a dogs tongue in his shooe vnder his great toe, there will no Dogges bay or barke at him.

In this passage we may, perhaps, find the origin of the old precept to take a hair of the dog that bit one. The ancient physicians do not seem to have known of the

drastic method of curing the disease by smothering the patient which is referred to by one of the characters in Charlotte Brontë's *Shirley* as the regular practice, and which, if legends and stories from different parts of the world are to be believed, was sometimes actually carried out. We know a castle in Scotland where a lady of high degree is said to have been "cured" in this summary fashion. It used to be believed, not so long ago, that patients in lock hospitals were dealt with in the same way.

SCIENCE NOTES.

One of the most interesting of recent clinical inventions is described in *La Nature* of July 16th. It is an instrument for recording the electrical variations of the heart. Until a few years ago investigation of the heart's action in the living subject was dependent on the cardiograph and sphymograph for the most part, but physiologists have recognized that these give only an indefinite and inexact indication of what actually occurs. Waller was one of the first to apply electrical methods to the study of the heart *in vivo*. The electrical variations in the heart are transmitted to the adjacent parts and thence throughout the whole body. It is thus apparent that with a suitable apparatus the method of application is extremely simple, for the electrodes can be placed practically anywhere on the surface of the body. An early form of recording instrument was the capillary electrometer of Marey and Lippmann, but Einthoven improved greatly on this by the invention of an extremely sensitive string galvanometer. Bull, of the Marey Institute, has further improved this by the addition of a photographic recording apparatus. This consists of a box, inside which a wheel covered with sensitized paper revolves. On the axle of the wheel there is an interrupter breaking the current from an induction coil a certain number of times during each revolution of the wheel. A slit allows the entrance of light from an arc lamp. Einthoven's galvanometer is placed in the path of this light and the deflections of the very fine galvanometer string are recorded. In making an observation the patient is seated comfortably in a chair, each hand dipped into a vessel containing salt solution. These act as electrodes and are connected by wires to the galvanometer. An extremely accurate record of the heart's action is thus obtained on the photographic paper. The apparatus is obviously not suited for general clinical use, but it could be quite readily employed in a hospital. There is the advantage that the patient need be disturbed very little if at all, for he can be connected by wire to the electrical room. This is done at Leyden, where the hospital is in connexion with Einthoven's laboratory by a wire nearly a mile long.

In the *Journal of Medical Research* for June L. F. Rettger describes a new and improved method of enumerating air bacteria. In relation to public health, the determination of the number of bacteria present in air is not infrequently a matter of some importance, and it is not at all apparent that the methods hitherto in use are of absolute reliability. Petri's original method was to filter air through sand, which was then mixed with gelatine and incubated. Various modifications of this have been described. An earlier plan, adopted by Hesse, was to draw air slowly over the surface of gelatine in a long horizontal glass tube. The process was dependent on the rapid settling of the bacteria on the surface of the gelatine. Winslow's more recent two-bottle apparatus is based on the same principle. Still another method is to filter a definite volume of air through liquefied gelatine, which is then poured into plates. Rettger's new method is essentially a modification of the last. It is extremely simple, and he claims for it a high degree of accuracy. The apparatus consists of a wide test-tube into which 5 c.cm. of sterile normal saline is put. The tube is plugged with a rubber cork pierced by two holes, one of which serves for the passage of the outlet tube, and the other admits the introduction of the aëroscope. This is a small glass tube with a round bulb at one end. The bulb is perforated by about a dozen small holes, and dips into the normal saline in the test-tube. The other end of the aëroscope is bent at an angle so as to prevent dust or bacteria falling into it. The apparatus having been thoroughly sterilized and freed from moisture, a measured quantity of air is drawn through by means of an aspirator. The bacteria in the air are caught by the normal saline, which is then mixed with an equal quantity of double-strength nutrient gelatine and plated. A source of error is due to the fact that bacteria adhere to the walls of the aëroscope. An error of over 10 per cent. may be introduced from this factor but can be obviated by disconnecting the aspirator, plugging the outlet and aëroscope with cotton-wool, and sucking the saline into the aëroscope two or three times. By connecting two such apparatus in series, Rettger has shown that practically 100 per cent. of the bacteria are collected by the first. He has used the method for over a year with complete satisfaction.

BRITISH MEDICAL BENEVOLENT FUND.

At the August meeting of the committee nineteen cases were considered, and grants amounting to £190 made to seventeen of the applicants. Appended is an abstract of the cases relieved.

1. Widow, aged 72, of L.R.C.P.Edin. Has supported herself and an invalid daughter by letting lodgings since her husband's death thirteen years ago; now finds that her rooms are often unoccupied, and that she cannot work as hard as formerly. Voted £12.
2. M.R.C.S., aged 69. Is quite incapacitated and dependent on his wife, whose income is less than £1 a week; children unable to help. Voted £10.
3. Widow, aged 43, of L.R.C.P., L.R.C.S.Edin. Maintained herself for some years after husband's death by acting as matron at a school, but three years ago became permanently deaf, and has since had to depend upon precarious earnings by needlework. Son, aged 15, has just been apprenticed to the Merchant Service. Voted £12.
4. Daughter, aged 59, of L.R.C.S.I. Was a teacher for many years, but is now unable to obtain pupils, and, having no means, is dependent on a sister whose only income is derived from two annuities of £20. Relieved once, £12. Voted £12.
5. Widow, aged 52, of L.R.C.P., L.R.C.S.Edin. Quite unprovided for at sudden death of husband about five years ago, and dependent on small, uncertain earnings by needlework and slight help from a brother-in-law. Two children, aged 19 and 15, the elder at a training college for teachers. Relieved five times, £52. Voted £10.
6. L.R.C.P.Edin., aged 65. Has been quite incapacitated for more than a year past, and is, with his wife and an invalid daughter, dependent on a brother, who pays for their rooms and allows them a few shillings a week. Relieved once, £18. Voted £18.
7. Daughter, aged 67, of late L.S.A. No income, and physically unable to undertake continuous work. Relieved three times, £30. Voted £10
8. Widow, aged 52, of L.R.C.P.I. Since husband's death eight or nine years ago has supported herself as a nurse, but has recently had three serious illnesses, and is consequently out of work. Relieved once, £5. Voted £10.
9. L.R.C.P., L.R.C.S.Edin., a medical woman, aged 35. For the last four years has been a constant sufferer from colitis, and quite unable to earn a living. Relieved once, £18. Voted £18.
10. Daughter, aged 62, of late M.R.C.S. No income, and dependent on friends and small earnings by needlework. Relieved four times, £48. Voted £12.
11. Widow, aged 40, of M.B., C.M.Aberd. Endeavours to support herself by letting rooms, but at present has no lodgers. Two children, aged 12 and 10. Relieved three times, £22. Voted £12.
12. Daughter, aged 64, of late L.S.A. Only income an annuity of £20, and is in delicate health. Relieved twelve times, £116. Voted £12.
13. Widow, aged 55, of L.R.C.P Edin. No income, and dependent on two sons whose earnings are small. Relieved three times, £30. Voted £10.
14. Daughter, aged 61, of late M.R.C.S. Used to maintain herself as a dispenser, but can no longer obtain work as such, and is dependent on uncertain earnings from wood carving and slight help from a sister who has to earn a living. Relieved four times, £40. Voted £10.
15. Widow, aged 53, of L.R.C.P.I. Quite unprovided for at husband's death a few years ago, and health does not permit of anything but light work. Is at present acting as caretaker, but receives neither salary nor food. Relieved three times, £36. Voted £12.
16. Widow, aged 80, of M.R.C.S. Has a small income, but applies for a little help owing to the infirmities of her children, three of whom are deaf and dumb and one epileptic. Relieved eight times, £55. Voted £5.
17. Widow, aged 60, of late M.D.Edin. Has a situation as companion, but only receives a small salary, and has to help a delicate daughter. Relieved once, £5. Voted £5.

Contributions may be sent to the Honorary Treasurer, Dr. Samuel West, 15, Wimpole Street, W.

British Medical Journal.

SATURDAY, AUGUST 27TH, 1910.

THE PROGRESS OF ELECTRO-THERAPY.

FROM the account of the proceedings of the Section of Radiology and Medical Electricity, which appears elsewhere in this issue, it is clear that workers in this department of medicine are not resting on their laurels. On the contrary, they are steadily quartering old ground in an endeavour to better results, ever annexing new territory, and with the assistance of manufacturing firms paying much attention to securing safer and more accurate appliances. Several of the papers deal with the latter subject; while the rest, though not definitely so divided in our columns, fall easily into two classes, one dealing with the therapeutic application of different forms of electricity, and the other with its use as a diagnostic agent.

There is also a contribution from Sir J. J. Thomson, who, though speaking as a pure physicist, nevertheless had some very interesting suggestions to make. Emphasizing the physical and therapeutic distinctions commonly drawn between hard and soft radiation, he showed that rays of almost any degree of hardness or softness might be obtained with absolute certainty by taking advantage of the fact that the secondary radiation occurring when a Roentgen output impinges on a metal, varies in hardness precisely with the atomic weight of that metal. He also drew attention to a very remarkable fact in respect of the absorption of the energy of radiation by hydrogen. This, of course, depends, as in the case of all other substances, on the quality of the radiation, but seemingly it is in direct instead of inverse ratio to hardness. The one suggestion, if put to practical use, would have the very desirable effect of substituting a scientific for the present almost empirical fashion of securing the kind of radiation required, but the other would seem scarcely capable of utilization unless it could be shown that the hydrogen contents of diseased and normal tissues notably differed. Apart, however, from any immediate practical utility attaching to these ideas, they are of interest as proving how far we still are from complete comprehension of the mysteries of radiation, and how much, therefore, may reasonably be expected in the future of a form of treatment which has already proved of much utility.

The papers on treatment by electric ions make it clear that iontophoresis, as it has been called, somewhat painful as it is, has a more assured future before it than at one time seemed to be the case, and that the results obtainable in dealing with joints enlarged through rheumatoid arthritis and other causes are sufficiently satisfactory to make such treatment worthy of consideration in a class of case little amenable to most forms of treatment. It also appears that Dr. Lewis Jones has successfully applied the same therapeutic measure to cases of corneal ulcer, and in his opening remarks the President, Dr. Mackenzie Davidson, reminded us of his successful attack on diseases of the same order by radium. The circumstance is of interest, since the locality in question is the last to which such powerful remedies might *prima facie* be expected to be usefully applied. It is also clear that hyperidrosis must now be included in the field of successful *x*-ray work.

The investigations recorded by Drs. Dawson Turner and T. J. George on the effect of *x* rays in therapeutic doses on the growing brains of rabbits are of interest as representing a careful piece of research work, but almost admittedly they could hardly be taken as proving anything more than that there is room for further investigation of the kind. If the results as they stand were transferable to children submitted to *x*-ray treatment as a cure for ringworm one would expect all such children to lose weight rapidly, and many of them to die, whereas there is overwhelming clinical evidence that the children escape unscathed.

Early in the history of *x*-ray work there crept in the unfortunate practice of employing unqualified, though to a certain extent technically skilled, men to perform what was then regarded as purely routine work, but it is now dying out and the field of the skiagrapher growing proportionately. The assistance which skiagraphic methods render is becoming of a more dependable character, while at the same time radiologists are less disposed than formerly to claim that screen examinations and skiagraphy can be substituted for clinical examinations or for ordinary physical methods of diagnosis.

In view of the wide field covered by the discussions one might have expected to hear something on the subject of intentional filtration in connexion with *x*-ray work, as at the Annual Meeting last year it was indicated that promising researches on this point were in hand. Possibly no more will ever be heard of it now, for, if the suggestion already mentioned as having been put forward by Sir J. J. Thomson is utilized, filtration, though still necessary in radium work, would be superfluous in using Roentgen radiation.

Apart from their contents, the tone of most of the papers is notable. The weapons of the medical electrician are of a more purely scientific kind than any other in the *armamenta* of medicine and surgery, and the spirit in which they are used is thoroughly in keeping. It is a point which must strike those who can recall the medical electricity of thirty years ago. How thoroughly scientific are the present lines of work is well shown by the fact that on behalf of one form of application, whose results are not readily demonstrable, it was pleaded in effect, though not in words, that it should be judged from an empirical standpoint. This is high-frequency work, on which there is an inclination among many neurologists to look somewhat askance. Independently of its utility in various disorders characterized mainly by minor degrees of pain and discomfort, it was shown that many neurasthenics —including in that term able-bodied persons merely nervously overtired and not exhibiting the more prominent phenomena of that disease—frequently find high-frequency applications of benefit. Summed up, the view would seem to be that high-frequency applications may, if nothing else, fairly claim to be regarded as a useful tonic.

Each reader must decide for himself what conclusions should be based on the nine cases of growths of a malignant order demonstrated by Dr. Dominici after treatment by ultra-penetration. This method of applying radium has so far been comparatively little practised in this country, but it seems scarcely open to question that its effects are, in some cases at any rate, of a most desirable nature.

The last communication to which attention should be drawn is one of a different order from any of the rest—the address delivered by Dr. Jellinek of Vienna, the occupant of a chair of electro-pathology recently founded in the university of that city. He showed how very complicated and various in their nature are the injuries due to unintentional contact with electrical machinery, and did something towards explaining how it is that a current which in some cases leaves the victim but slightly harmed in other cases kills him. A point of pathological interest and much clinical importance demonstrated by him is that a common result of a severe electric shock is rupture of fine vessels in the brain. This being the case, it follows that when in the administration of first aid to such patients the head should be raised, not lowered. Incidentally, Dr. Jellinek supplied also an addition to the list of cases in which the influence of mind on body has been proved in tragic fashion. A workman who had been urgently warned not to interfere with a certain live wire accidentally touched it. He expected to be killed in consequence, and, in fact, instantly died, though at the moment the wire was harmless, since no current was passing. At the *post-mortem* examination he was found to exhibit the phenomena of status lymphaticus; this condition may also perhaps be the true explanation of some other cases in which the effect of mind on body has been very obvious, but the very reverse of that of which recently so much has been heard.

A FRENCH VIEW OF HYPNOTISM.

IN a recent number of the *Semaine Médicale* (No. 30, July 27th) Dr. Babinski, well known as an eminent neurologist and a former *chef de clinique* of Charcot at the Salpêtrière, has published a remarkable article on the present position of hypnotism, which he contrasts with the stir it made thirty years ago. "Nowadays," he says, "who uses hypnotism?" Does this mean that treatment is only a question of fashion, or that the method has presented greater difficulties than were expected, or was its utility only an illusion? He asks why physicians who formerly practised hypnotism extensively have ceased to do so except on rare occasions; and he discusses the medico-legal question of the bearing of hypnotism on "free will" and legal "responsibility." He begins his inquiry by attempting to arrive at a clear conception of hypnotism. By different procedures in certain subjects a physical perturbation of the nervous system may be induced, one consequence being exaltation of susceptibility to suggestion. It may be argued that as certain functional disorders or morbid conditions yield to the influence of suggestion when susceptibility thereto is heightened, the indication is to hypnotize patients affected by these pathological manifestations. This conception is absolutely rational if the basis on which it rests is sound, but we cannot admit the exactitude of the facts which are its foundation. There is no proof that the hypnotic condition possesses objective somatic characters which cannot be reproduced by the will. It is quite true that the phenomenon may be real, while there are undoubted facts in psychology of which it would be impossible to produce objective proof, but the reality of hypnotism is not so obvious as that of such mental disorders as delusions of persecution, melancholia or *folie du doute*, and the hypothesis that all hypnotism is a comedy is not absurd; it is a question upon which there must be differences of opinion amongst physicians who are familiar with the subject, and these opinions will probably depend upon the mental constitution of the observer. Babinski, having at the commencement of his career in the Salpêtrière and during many subsequent years had abundant opportunities of studying the subject and observing many patients who presented the most perfect characteristics of hypnotism, believes in the genuineness of hypnotic sleep, and that it differs from all other kinds of sleep, but is capable of being easily simulated. When hypnotism was in full vogue at the Salpêtrière there were at least ten patients upon whom experiments were being constantly made, and it would have been impossible for these people to have shammed without the fact becoming known to other patients in the wards; yet Babinski heard no rumours of such a kind, while some patients showed their belief by asking to be treated by the same method. At the same time he is far from thinking that hypnotism is all that it was held to be thirty years ago. At that time it was generally believed (1) that a subject could be hypnotized against her will, (2) that the hypnotized person forgot on waking all that had happened during the hypnotic sleep, (3) that in the lethargic condition the subject was unconscious, and (4) that in the somnambulant condition the subject's own will was absent and she was obliged during hypnosis, or after waking from it, to perform any actions suggested to her. Dr. Babinski holds that no one can be hypnotized against his or her will; that the hypnotized subject does not forget what happened during the sleep, as he has convinced himself by repeated tests that the patients know and recollect all that has happened; that in the lethargic condition the subject is not unconscious, nor the somnambulant subject under the complete control of the hypnotizer. So long as the subject is asked to do harmless or indifferent actions they are performed willingly; but if repugnant, or even disagreeable, they are refused, and resistance, he holds, would be much greater if an immoral action or a crime were suggested. He does not believe that hypnotism creates or augments susceptibility to suggestion, and although it is true that formerly many hysterical patients were cured after they had been hypnotized, hypnotism had really nothing to do with the cure; they were merely hysterical people capable of being treated by suggestion apart from any hypnotic procedures. In his opinion, not only is hypnotism generally useless, but attempts to hypnotize may make the physician miss the end he has in view; for, if he begins by telling the patient that he will send her to sleep, and fails to do this, she loses confidence in him; whereas he would probably have succeeded had he in the first instance suggested to her the disappearance of the paralysis or contracture.

Nevertheless there are certain hysterical patients so prone to self-suggestion that hypnotism alone can restore them to health, since they are not accessible to psycho-therapeutics in the waking state. In such cases hypnotism is perfectly legitimate, and Dr. Babinski uses it without hesitation. With regard to the medico-legal problems, he is convinced that no hypnotized person can be made to commit a crime or an immoral action against his or her will. It is absolutely impossible to furnish definite proof of the hypnotic state in any given case; but while admitting the reality of hypnotism he will not allow that it can make any one irresponsible for crime. It is possible to persuade a person to commit a crime, and there are certain weak individuals who can be more easily persuaded than others to do acts

which they know to be wrong, but this is true of them apart from hypnotism, and in the opinion of Babinski there is no ground at all for the fear that hypnotism confers a power which can be abused for criminal or immoral purposes.

It must be understood that in this article we have only given Dr. Babinski's personal views on hypnotism. They are interesting, however, as coming from a man of such large experience, and one who has had such ample opportunities of observing changes of opinion and practice in France.

THE MEDICAL DIRECTORY.

We are asked to state, for the information of our readers, that the circular sent annually by Messrs. J. and A. Churchill to each member of the medical profession will be posted on September 1st. It may be pointed out that this is a month later than was formerly the case. Though the change involves considerable extra pressure of work, it is believed that it is greatly appreciated, and it has proved to be an advantage to avoid making applications for returns during the holiday month of August. It will greatly facilitate the work of those responsible for the publication of the *Directory* if practitioners will be so good as to return the circular without any delay. As is now usual, the *Medical Directory* will be published before Christmas. The Climatological and Balneological section, by Norman Hay Forbes, F.R.C.S.Edin., has been extended to include Continental as well as British spas and health resorts.

PARLIAMENT AND THE MEDICAL PROFESSION.

When addressing the State Medicine Section on the Coroners' Law and Death Certification Bill at the recent Annual Meeting, Sir William Collins, M.P., told his hearers that the medical profession was "suspect" in the House of Commons, and that the prevailing opinion in the lobby was that the medical profession was "out for fees." This was represented as a valid excuse for not inserting in the bill a clause dealing with the question of remuneration for services rendered. Any other course, it was contended, would imperil the chance of the bill becoming law. The Legislature in times past has wrongfully imposed statutory obligations and demands upon the medical profession in the discharge of duties to the State and for the State without provision for recompense or reward. Suspicion haunts the guilty mind. This probably is the explanation of the alleged state of mind in the House of Commons. As for the prevailing opinion in the lobby, if the view mentioned above means that the medical profession is regarded as having awakened to a sense of the injustice of State demands on the time and services of medical men without remuneration, that view is undoubtedly correct, but it is not an attitude which calls for any apology or modification. If the insertion of a clause in an Act of Parliament safeguarding the medical profession from an injustice which no other body would tolerate means the wreck of an Act, then in the name of reason and fairness such an Act should be wrecked. We are told to wait and see, and that in the end good may be the final goal of ill. There is nothing in the past experience of similar enactments to warrant the belief that such will be the case, for it may truly be said that in such matters the House of Commons is "suspect." The amendment of the laws relating to Coroners and to Death Certification is in the public interest, and for the benefit of the State. That being so, it is a scandal that opprobrious epithets should be applied to the medical profession for insisting that in any such amendments as may be deemed desirable, due regard should be paid to fairness and the simple and universally demanded rule of *quid pro quo* be observed.

THE RETIREMENT OF DR. SEATON.

Dr. Edward C. Seaton's retirement from the post of Medical Officer to the Administrative County of Surrey, which was recently announced in the Journal, is a serious loss, not only to the county which he served so well for twenty years, but to the sanitary service of the country. Dr. Seaton, whose father's name is famous in the history of vaccination, had had a large experience in the scientific and administrative work of public health before he decided to give his services entirely to Surrey. In 1871 he began his work by assisting in the sanitary inspection of Oxford during an epidemic of typhoid fever. In the following year Mr. Mundella formed a commission to inquire into the physique of children in the factory districts, and Dr. Seaton was appointed an Assistant Commissioner to make medical inspections of school children in Lancashire and Cheshire. At the end of that year he was appointed the first Medical Officer of Health for Nottingham. In 1884 he became Medical Officer of Health for Chelsea; that post he held until the end of 1890, when he accepted the post which he has recently resigned. A brief summary of his work will show what valuable service Dr. Seaton has rendered to public health. He was the author of the very first report under the Housing Act of 1875, which contained a clause allowing the medical officer of health, entirely on his own responsibility, officially to declare an unhealthy area. His work at Chelsea was somewhat on the same lines, as a very large part of the slum property was dealt with during the years 1884–1900. He was appointed in 1890 as a special commissioner for the Home Office, along with Mr. Cubitt Nicholls, to inquire into and report upon the condition of a very insanitary part of the East End of London. In Surrey he has constantly given advice and assistance to the borough and district medical officers of the county, and has always urged upon them the fundamental importance of attending to the sanitation of the dwellings of the working classes. Through the influence of the Sanitary Committee of the Council, valuable work has also been done by securing for the sanitary inspectorship a position apart from that of the surveyor. In a county such as Surrey this has been one of the most important steps that could be taken under the existing powers towards the improvement of the dwellings of the working classes. Dr. Seaton had a great deal to do with the movement for the notification of infectious diseases, a clause for the purpose of securing this having been inserted by his advice in a local Act obtained by the Nottingham Town Council as far back as 1878. In 1882 he organized an important meeting at a Congress of the old Social Science Association. There, with the co-operation of the medical officers of health of Edinburgh, Birmingham, and Dublin, he defended the movement as to which at the time there was very strong medical opposition in the town. Subsequently, in 1889, the clause which was drawn up in 1878 became the basis of a Government measure, and the first part of his period of office in Surrey was occupied in securing its adoption by the different local authorities. He had had to deal from the earliest part of his career with typhus, which has now become extinct. Following in the footsteps of his father, he gave much attention to smallpox, which, though it has not troubled us much of late, may do so again at any time. In Nottingham Dr. Seaton had the whole responsibility of dealing

with the epidemic of 1881–2. In London, a few years later, in conjunction with Sir Douglas Galton, he advised on the metropolitan arrangements connected with the extra-urban treatment of small-pox, a measure which has been of very marked influence in the limitation of epidemics of late years. During the presidency of the late Sir Andrew Clark, Dr. Seaton got a committee of the College of Physicians to act in conjunction with the Metropolitan Asylums Board, and they induced the President of the Local Government Board to bring in a bill to allow medical students to study the diagnosis of small-pox and all the fevers at the Asylums Board hospitals. The course of instruction at these hospitals is now an essential part of the education of medical men, and has proved a great help in the practical working of the Notification Act. Dr. Seaton has always taken an active interest in medical educational work, having for many years performed the almost honorary work of lecturing at St. Thomas's Hospital, besides examining in State Medicine at the Universities of London, Oxford, and Cambridge, as well as at the Royal Colleges of Physicians and Surgeons for the Diploma in Public Health. He also edited the works of Sir John Simon, that great master in sanitary science. Dr. Seaton has also done most valuable work in river purification and water supply. He assisted in the foundation of a County Nursing Association for Surrey, an institution which is likely to prove most beneficial. Throughout his official life Dr. Seaton has always shown great tact in securing harmonious working among the district authorities and their officials, especially his colleagues, the medical officers of health, with whom he has been on the very best of terms. The Surrey County Council accepted Dr. Seaton's resignation on the ground of health with great regret, and recognized his services by appointing him Consulting Medical Officer of Health at a salary of £300 a year. Dr. Thomas Henry Jones, formerly Assistant Medical Officer of Health for the County of Surrey, was appointed to succeed Dr. Seaton, whose numerous friends will join us in wishing him many years of useful life. Besides his consulting work, he will, we understand, deliver a special course of lectures at the London University.

UNREGISTERED DENTISTS.

it is the last straw which breaks the camel's back, it is the last straw but one which sometimes saves the life of that curiously constructed animal. The same useful part may perhaps prove to have been played, in the case of the profession of dentistry, by the decision of the House of Lords on the interpretation to be placed on the Dental Act. The proof furnished that this Act offers no real protection either to registered and qualified dentists or to the general public has attracted a good deal of attention in various quarters. One lay paper which has grasped the dangers of the situation to the full is our contemporary *M.A.P.*; having since studied the subject for itself, it devoted some long articles in its issues for August 6th, August 13th, and August 20th to an endeavour to arouse, as it states, public indignation at a law which permits any one to practise dentistry however ignorant he may be of the work. After pointing out the important part that teeth play in the human economy, and how much suffering and injury is caused by their mistreatment, it shows in various fashions that as things are at present an average person seeking relief for dental troubles is as likely as not to hand over the care of his mouth to the tender mercies of a man who has absolutely no knowledge of dentistry, while all the time believing that he is receiving the best advice obtainable. This is because nothing stands in the way of unregistered practitioners of dentistry, however incompetent, describing themselves by names indistinguishable except by the expert from those properly borne by registered and fully qualified dentists. It estimates the number of unregistered persons engaged in dental practice in one way and another as between 40,000 and 60,000, whereas the number of registered dentists is only about 5,000; and this being the case, concludes that it is no exaggeration to say that the teeth of the nation are in the hands of quacks. It is pointed out that though dishonesty and highly undesirable practices prevail among them, all unregistered practitioners of dentistry are not dishonest persons; but naturally, lacking as they do the knowledge and skill that can only be acquired by long training under competent instructors, they cannot be expected to perform their work efficiently. But despite this saving clause in favour of certain practitioners, it is held that all unqualified men alike should be branded as quacks, and not permitted to describe themselves in terms which lead the public to believe that they possess proper qualifications and have enjoyed the advantage of real training. A crusade of this character on the part of a lay paper is so rare an occurrence that naturally it has aroused both surprise and wrath amongst the unqualified. What makes the articles the more effective is that their tone is moderate and the writer has evidently studied the subject thoroughly. Indeed, the only weak point they present is that a number of men who have banded themselves together under the title of the Incorporated Society of Extractors and Adaptors of Teeth have induced the author to extend to them a certain degree of editorial protection. But on *M.A.P.*'s own showing, these men, when they practise dentistry on their own account, instead of confining themselves to performing for real dentists the more purely mechanical tasks which dentistry involves, are as much quacks as any of those mentioned. However great their mechanical skill may be, they are men who, so far as they can show, have no knowledge of the sciences which underlie and play an essential part in all good dentistry. The articles are thoroughly worth reading by those interested in the subject, and will no doubt do something, at any rate, towards fulfilling their object. This is to amend the law in such fashion as to prohibit the practice of dentistry by any person not in possession of a licence or certificate granted by some recognized authority under the jurisdiction of the General Medical Council.

THE OPIUM HABIT.

A LAY contemporary, which during the past few months has exhibited considerable interest in medical subjects, has discovered that the opium habit is spreading in this country with "baffling rapidity," and is laudably anxious to play its part in staying the alarming tide. For this purpose it has set to work and learnt for itself the real facts. Some of them will cause general astonishment. Who would have thought, for instance, that morphinomaniacs figured largely among the occupants of so-called inebriate homes? On the other hand, it can scarcely be news to any one that society people, including popular jockeys and politicians, steal from South Kensington and Mayfair, where such persons, of course, invariably live, to resort to vile haunts furnished by West End firms at a cost of £2,000. It is easy to believe that only men and women rendered callous by their craving could put up with such surroundings. There is, however, one disclosure over which those

who are students of neither Tariff Reform nor Free Trade may be apt to stumble. Since the cost of opium is about 17s. a pound, it is difficult to understand how the Lancashire tobacconist contrives to supply the Lancashire mill-girl, at a price within her means, with opium-impregnated cigarettes. She smokes them, it appears, by way of gaining temporary relief from the weariness and pain attendant on a life of toil. This is quite a good sentence, and having borrowed it from Peter, we offer it to Paul for use next Sunday in Hyde Park. In fashionable circles much of the evil, it appears, is due to West End medical men supplying opium to those who pretend they require it as medicine. This is all the more credible, because it is so well known that West End practitioners with fashionable patients invariably run dispensing practices! Various other disclosures are made as to the way in which the present race of opium cravers obtain their supplies, but on the whole the most remarkable circumstance of all is one on which our contemporary throws no light. Why do opium cravers, a cunning and knowing class, resort to all the devices in question, when they have only to walk into a chemist's shop where they are "known" and ask for what they want? Opium in any quantity and in any of its forms can lawfully be sold without a medical prescription to any person "known" to the vendor. The requirements of such an elastic term may be fulfilled merely by a few anterior visits for the purchase of some pills or tooth powder. To the credit of pharmacists be it stated that many of them step outside the law and will not sell opium except on a medical prescription; on the other hand, there is nothing to prevent a medical prescription being made up *ad infinitum*, and many chemists stand on their rights and sell opium-containing preparations to all "known" to them. They may be morally wrong, but cannot legally, and hence reasonably, be blamed even if they know the disastrous object of the purchase. If our contemporary wishes to do good it should get the law on the subject altered. It would meet with no opposition on the part of pharmacists as a body.

PRECAUTIONS AGAINST CHOLERA.

THE Local Government Board has issued a circular to port sanitary authorities and certain riparian sanitary authorities calling their attention to the fact that cholera is again seriously epidemic in Russia, particularly in the St. Petersburg district and at Cronstadt and other Russian ports. The sanitary authorities of British ports trading with Russia should, it is urged, be on their guard against the importation of cholera into their districts by vessels coming from places where the disease has appeared or is likely to appear. In this connexion, says the circular, it is essential that the medical officers of health of such British ports should endeavour to keep themselves informed as to the spread of the present outbreak of cholera, and especially as to the continuance of the disease in ports where it now exists and its appearance in other ports not yet known to be affected by it. The statement which the Board issues weekly to the medical officers of health of port and riparian sanitary authorities, and which contains information as to such cholera occurrences as have come under the Board's notice, will be of assistance in this direction. The fact is recalled that on September 9th, 1907, the Board issued a revised General Order relating to cholera, yellow fever, and plague on ships arriving from foreign ports. The Board relies on the port and riparian sanitary authorities taking all necessary steps under that Order to prevent the introduction of cholera into this country. Special attention, it is pointed out, should be paid to ships bringing aliens from Russia to British ports. The Local Government Board for Scotland has also issued a circular regarding cholera. The necessity for readiness and vigilance is pointed out. Special precautions should be observed with regard to vessels coming from North Russian and Black Sea ports. Probably never before have such full, careful, and elaborate means been taken for meeting a possible outbreak of cholera in Scotland. Dr. Dittmar has recently been visiting all the medical officers of health and making arrangements against possible contingencies. The various ports in the Firth of Forth are of course danger zones, carrying on as they do much trade with Russian Baltic ports. It is not always the important ports that are the most dangerous points. On the contrary, it is often some insignificant port that is the inlet for danger. The Black Sea is less important for Scotland, since the time occupied by transit to Scotland reduces the danger to a minimum.

QUACK REMEDIES.

AMONG the accounts of various secret remedies which have appeared in this JOURNAL during the past few years (many of which have now been brought together in a book named *Secret Remedies*) was one dealing with Stevens's Consumption Cure. A special point about it was that attempts were being made to secure purchasers by guaranteeing to pay a stated sum if it did not cure them. The documents in which the guarantee was given were, however, so worded that though they might readily deceive people it was not likely, it seemed to us, to prove possible to enforce the guarantee in any given case. We are glad to see now that in this respect we were mistaken, for, as will be found on reference to our medico-legal columns this week, the widow of a deceased patient has actually succeeded in recovering a sum of £10 promised by the proprietor if his treatment were followed but did not cure the patient. It will be noted, too, that in delivering judgement his Honour Judge Gye dealt faithfully with quacks in general, and spoke of the action of this particular specimen as being an intentional and well-considered fraud, adding that his remedies were quack remedies, not having the slightest value of any kind. In some circulars which this person has issued it has been stated that the ingredients of his "cure" are entirely original discoveries, drugs never used before by any chemist or doctor; it was added that he was ready to give any doctor its formula if desired. As apparently no medical man expressed any curiosity on the subject, he subsequently addressed circulars to medical men themselves inviting their co-operation, and pretending to disclose the composition of his cure. It was, he said, umckaloabo root and chijitse in certain proportions. If he had said that it was extract of high-cockalorum-jig-jig-jig, it would have been equally informing. Subsequently we had the preparation analysed, and found that its contents were of a very simple kind—some alcohol, some glycerine, and a solid substance identical in its characteristics with krameria. The latter is a very familiar drug, but one whose chief claim to continued inclusion in the *British Pharmacopœia* is that it is a harmless astringent. It is absolutely valueless as a cure of consumption, or of any other disease for which the decoction in question purports to be useful. It was also found that the quantity of the "cure" sold for 5s. could be prepared in accordance with the analysis by any chemist for less than 2d. It is worth noting that the same ostensible remedy is also sold under the names of "Sacco" and "Lungsalva," and that our contemporary *Truth*, which has on many occasions dealt with this "cure," states, in the latest

issue of its *Cautionary List*, that passages from its columns condemning the sale of "Sacco" have been used in a mutilated form as an advertisement.

THE MYSTERY OF WOMAN'S HAIR.

READERS of Scott's *Life of Swift* will remember the story of the small packet containing a lock of hair with the inscription "Only a woman's hair" in the Dean's handwriting. The hair is believed to have been Stella's, and Scott quotes the inscription as an example of Swift's cynicism. Others, perhaps more discerning, have seen in it a sign of a heart throbbing with love which the writer tried to hide under a flimsy disguise of indifference. It scarcely lies within our province to decide questions of sentiment; we will therefore say nothing on that point. We assume that the hair was Stella's own; otherwise the romance would evaporate. This, however, would be an unwarrantable assumption in many other cases. The origin of many women's hair is a mystery which the rude masculine mind will do well not to seek to unveil. Where do the hairdressers get the glorious locks with which they decorate their windows? Black hair, it may be conjectured, comes from the South. Mr. Francis Trollope, in a book entitled *Summer in Brittany*, gives an account of what he called a hair market. Speaking of a fair in Collenée, he says: "What surprised me more than all, by the singularity and novelty of the thing, were the operations of the dealers in hair. In various parts of the motley crowd there were three or four different purchasers of this commodity, who travel the country for the purpose of attending the fairs, and buying the tresses of the peasant girls. They have particularly fine hair, and frequently in the greatest abundance. I should have thought that female vanity would have effectually prevented such a traffic as this being carried to any extent. But there seemed to be no difficulty in finding possessors of beautiful heads of hair perfectly willing to sell. We saw several girls sheared, one after the other, like sheep, and as many more standing ready for the shears, with their caps in their hands, and their long hair combed out, and hanging down to their waists. Some of the operators were men, and some women. By the side of the dealer was placed a large basket, into which every successive crop of hair, tied up into a wisp by itself, was thrown. No doubt the reason of the indifference to their tresses, on the part of the fair Bretonnes, is to be found in the invariable 'mode' which covers every head from childhood upwards, with close caps, which entirely prevents any part of the hair from being seen, and, of course, as totally conceals the want of it. The money given for the hair is about 20 sous, or else a gaudy cotton handkerchief—they net immense profits by their trip through the country." Light hair comes mostly from Germany. It is sometimes stated that the colour of the hair is an index of character; if this be true, it is obvious that the character can be disguised by art. Queen Elizabeth was probably singular in her preference for a red wig, but the colour did not belie her temper. The colour most in demand, however, changes with the fashion at a given time. A fashion which we can only characterize as disgusting seems to prevail at present in certain places. This is the wearing of "rats," structures of which we confess we know nothing, but which we presume to be intended to be decorative. They are, it seems, made sometimes of wire, sometimes of human hair, sometimes of flax, or other vegetable which presents a more or less close likeness to human hair. In connexion with this matter, we touch darker mysteries than those of the French or German hair markets. We have recently seen it stated in an American paper that the hair dealers of Canton, from whom large supplies of black hair is received for the manufacture of "rats," have been discovered exhuming corpses for the sake of the pigtails. The Chinese Government is said to be taking steps to stop this new kind of burking. We trust it will be successful in its efforts, for the traffic in dead hair is dangerous from a hygienic as it is hideous from an aesthetic point of view. But what will not the devotees of fashion risk in the pursuit of their crazy cult? The trade in human teeth used to be highly profitable, and Bransby Cooper in his biography of his famous uncle gives an account of resurrection men who followed the troops in the Peninsula to get the teeth of the fallen soldiers, for which they got high prices in London.

BUYING UP THE MEDICAL PROFESSION.

AMONG the numerous suggestions stated to have been received, and to be still awaiting consideration, by the committee formed at the Mansion House in connexion with a memorial to His late Majesty are several of a distinctly medical order—by which phrase, be it noted, is not implied a medical origin, for some of them are distinctly wild to the verge of madness. Those of the saner kind include a proposal for the building of an open-air sanatorium for London consumptives. Realization of the scheme would be both a preventive and curative measure, and should be practicable if the buildings provided were of the simple, inexpensive kind now known to be the best for such purpose. To erect and endow a sanatorium of good size would not cost more than a sum such as might reasonably be expected to be collected by the committee in question. Another suggestion is that at each London hospital a ward should be named after King Edward. In view of His late Majesty's great and successful labours on behalf of hospitals this would be a very suitable kind of memorial, and need not necessarily entail the expenditure of more than the cost of the few pots of paint and books of gold leaf required for the placing of inscriptions over ward entrances. As, however, the naming of wards is a definite if seldom realized asset in hospital finance, it would scarcely be right to commemorate King Edward in the fashion indicated without paying a stated sum to each hospital. It is also proposed that by way of a memorial the whole of the medical, surgical, and dental practices in this country shall be nationalized. The very simplicity of the idea must make it attractive to statesmen of all orders, from Socialists downwards. Moreover, nothing material stands in its way; for while it would be superfluous to consult the medical profession before selling, or, rather, buying it up lock, stock, and barrel, the sum required would be a mere trifle. Apart from dentists there are some 32,000 medical men in the British Isles, whose work is commonly calculated to produce an average sum of £250. The gross amount is therefore £8,000,000, and this, when capitalized at the moderate rate of 5 per cent., is only £160,000,000. Having received that sum, medical men as a whole would, no doubt, gladly continue their work as salaried officers of the Crown. Other propositions which also, it is feared, have a medical aspect are those relative to the establishment of a memorial by providing for the temporary housing of persons mentally distressed, for free legal advice to the poor, and by raising a fund out of which temporary loans would be made to the needy and poor. On the other hand, in view of the extent of the consideration

which the medical profession commonly receives at the hands of the elected representatives of the people, and of other circumstances, the idea of forming a national Valhalla can scarcely be regarded as having any interest for medical men as such.

EXTRACTION OF THE LENS IN ITS CAPSULE

THE remarkable statistics published by Major Smith, of Jullundur, who has for years made a practice of extracting the lens in its capsule, have led to his method being imitated by many surgeons, not only in India, but also in America and on the Continent. With some few exceptions, however, the results obtained have fallen short of those claimed by Major Smith, and many celebrated ophthalmologists have declared themselves dissatisfied with the procedure because they have found that the percentage of cases in which vitreous was lost was unduly high. Thus, Professor Elschnig, of Prague, who gave the method an extended trial, was obliged to confess that the ultimate results were inferior to those which followed orthodox extraction. Major Smith contends that vitreous loss in his clinic is not materially greater than in other eye hospitals where the old operation is performed, and his claims are fully substantiated by surgeons who have worked with him at Jullundur. In the *Archives of Ophthalmology* for January, 1910, there are two papers dealing with the subject. Captain A. E. J. Lister, F.R.C.S, I.M.S, contributes one on the after-effects of the escape of vitreous during Smith's operation. He has carefully examined cases where small quantities of vitreous had been lost. He found that the effects of slight loss upon the subsequent vision might almost be neglected. About 5 to 6 per cent. lose a little, and only about 1 in 98 of such cases develop consequent fundus disease. No case examined had detachment of the retina. Captain Lister tabulates the final vision in 98 cases of vitreous loss. The majority had V. $= \frac{6}{6}$, and many had an even higher visual acuity. In fact, the general results of these operations in which vitreous had been lost are far better than those to be obtained from any list of the results of extractions by the normal method which has been published either in England or on the Continent. In the same journal Dr. Clerk publishes his observations made during a special visit he paid to Jullundur to study Major Smith's method. He cites 121 cases which came under his immediate notice, and amply corroborates all Major Smith's statements. Knapp's account of Major Smith's operation is not so favourable as Clerk's. He saw Major Smith operate at Jullundur, and gives the following statistics of 104 cases: Vitreous prolapse 12 per cent., iris prolapse or encleisis 16 per cent. Two cases of suppurative iridocyclitis and one subchoroidal haemorrhage.[1] Major Kilkelly,[2] I.M.S., speaks even more unfavourably of Smith's operation. Major Smith in February, 1909, operated upon 23 cases of cataract at the Civil Service Ophthalmic Hospital, Bombay, at the request of Major Kilkelly. The patients were kept in for periods varying from fifteen days to twenty-seven days. The visual acuities obtained were as follows: $\frac{6}{15}$, 1 case; $\frac{6}{20}$, 2 cases; $\frac{6}{30}$, 7 cases; $\frac{6}{40}$, 3 cases; $\frac{6}{60}$, 4 cases; fingers at 18 ft., 5 cases; hand reflex, 1 case. In 5 cases the capsule ruptured; in 2 there was vitreous loss; in 5 iris incarceration; in 4 capsule tags were included in the wound. Vitreous opacities were found in 9 cases, and iritis followed in 7 cases. Major Kilkelly states that after performing 600 extractions in the capsule he gave up the method, and he is of the opinion that these operations of Major Smith's clearly show that a high percentage of accidents occur, and that the average patient is exposed to an unnecessary risk. Upon the whole, therefore, one is disposed to believe that, magnificent as the Jullundur results undoubtedly are, and great as is the temptation to adopt the same practices, extraction in the capsule will always be reserved in Europe for special cases, and will never become the operation of election.

[1] Quoted by Elschnig, *Ophthalmology*, April, 1910.
[2] *Indian Medical Gazette*, May, 1910.

TAXI-CABS.

AT this particular moment, when the wrongs of the taxi-cab driver are in question, the rights of the taxi-cab user merit some attention. These being both carefully and clearly set forth in a little pamphlet, entitled *Twenty Points for Users of Taxi-Cabs*, the purchase of that publication would be a wise investment even if recommended by the owners of a bucket-shop. No praise could well be higher. It is published by the Temple Press, Limited, and is obtainable, we believe, at most bookstalls for the sum of one penny. It shows the user of a taxi-cab exactly what he must pay, and that makes it all the easier for him to decide the sum he will add voluntarily to his computation thereof by way of what the Turks term "bakshish," and our French friends, who are ever logical and in many ways more outspoken than ourselves, frankly entitle a *pour-boire*. In view of the great importance attached both by taxi-cab drivers and taxi-cab owners to the behaviour of the public in this matter, it is somewhat quaint to remember that when taxi-cabs were first introduced an argument used in their favour was that tipping would no longer be expected by cab drivers any more than by the steerers of omnibuses. But besides taxi-cab drivers, owners, and users, there is a fourth class of person quite as much entitled to consideration as any of the others. This is the class made up of ordinary wayfarers, whose interests should not be overlooked when the behaviour of taxi-cab drivers is under criticism. The proportion of accidents among them tends constantly to increase, despite the undoubted fact that motor cars are more easily controlled than cabs. One reason for this is that drivers of taxi-cabs have never yet been made to understand, either by the police or by any other authority, that the right of wheeled vehicles to the roadway is not exclusive, and that in this country, though not in France, the duty of avoiding accidents rests primarily on the shoulders of drivers and not on those of foot passengers. At present drivers seem to be under a very different impression—namely, that provided they can prove that they blew their horn no one can be blamed but the victim when accidents occur. Moreover, apart from actual accidents the public suffers materially through the nervousness nowadays inevitably involved when streets have to be crossed. The hoot of a motor horn is not a soothing sound in itself and the fact that when heard close by it usually has to be followed by a jump is a quite unnecessary addition to the various strains habitually put upon the nerves of Londoners. The worse offenders in this respect, however, are not taxi-cab drivers, but the chauffeurs of private cars.

SIR FRANCIS LOVELL, C.M.G., Dean of the London School of Tropical Medicine, will, it is announced, make a further tour of the West Indian Colonies during the forthcoming winter, on behalf of that institution, among the possessions which he proposes to visit being British Honduras, Bermuda, and the Bahamas.

England and Wales.

[*From our special correspondents.*]

BIRMINGHAM.

Employment of Married Women and Infantile Mortality.

An investigation has been made in Birmingham with regard to the effect of the industrial employment of married women upon infant mortality, and the result is embodied in the annual report for 1909 of the medical officer of health, Dr. J. Robertson. The investigation was carried out in a thorough manner in one of the areas where the industrial employment of women was greatest while at the same time the infantile mortality-rate was highest. The district covered an area of 289 acres, and had an estimated population of 41,884. The most important industry of the district was metal working. There were 1,503 children born alive during 1908, and 39 stillbirths were recorded, the birth-rate being a high one—namely, 35.8 per 1,000 of the population. Of the 1,503 children born it was found undesirable to include in the inquiry 36, on account of the fact that they were born in circumstances distinctly better than the 1,467 others, and therefore were not comparable. No less than 209 of the remaining infants were lost sight of during the twelve months ensuing after birth; 46 further cases could not be found. There were left, therefore, 1,212 mothers, and these were subdivided into 601 mothers who were not industrially employed during pregnancy and 611 who were so employed. The general conclusion was drawn that the number of mothers employed before the births of their babies was much larger than the number employed afterwards. It was found that whereas 50.4 per cent. were employed before the birth of their infants, only 31.5 per cent. were employed after the birth. The mortality among the infants born in 1908 of all mothers employed either before or after childbirth was at the rate of 190 per 1,000 births, while among those not industrially employed it was 207 per 1,000 births. It was also found that the mortality of those infants whose mothers were industrially employed during pregnancy was 198 per 1,000 births, and that among those who did not work the rate was exactly the same. Common sense would lead to the assertion that the infants of mothers who go out to work must be at a disadvantage, but it is probable that in considering the class of women dealt with in this investigation, there were other points which had an even greater influence on infant mortality than the working of the mother. In many cases the additional income brought in by the mother had an important influence in the prevention of poverty, which is one great cause of a high infant mortality. Again, a certain natural selection may have operated, many women who go to work being thrifty and energetic, and determined not to get below the poverty line, nor yet to neglect their home duties. Probably factory or workshop employment in itself is in the majority of cases not more exacting on a pregnant woman than that which the mother of a large family has to perform daily at home.

Dr. J. Robertson, in his general conclusions upon this investigation, says:

> The figures dealt with in this report relate to women, many of whom are in a state of poverty, and, as already pointed out, this alone has such an evident pernicious influence on the health of the mother and her offspring that the influence of industrial employment is to a considerable extent marked. Bearing this in mind, and taking into consideration our previous investigations on somewhat similar lines, it may be said that in Birmingham the type of industrial employment in vogue does not appreciably influence the health of the mother or her infant when the standard of comparison is that of women in equally poor circumstances who are not employed industrially.
>
> While this is the opinion I have come to from an investigation of the facts in these poverty-stricken districts, I do not for a moment maintain that such industrial employment is free from all harmful influence. The mere fact that it prevents breast-feeding in the majority of cases is, in my opinion, a reason for some State interference. Here, however, it appears to be a question in this Birmingham area as to whether the additional poverty which would be occasioned by preventing mothers from working for, say, six months after a birth would not be the greater of two evils.

EAST SUSSEX.

Medical Inspection of School Children.

The annual report of Mr. Alexander G. R. Foulerton, medical officer for the county of East Sussex, has lately been issued. Incorporated in it are the reports of Mr. A. Beeley and Mr. S. R. Gloyne, senior assistant medical officers. In an analysis of the results of medical inspection it is pointed out that, of a total of 10,774 children, 6,360 were found to be healthy.

Verminous Children.

Of the children with verminous heads, 5.76 were otherwise healthy. On this subject the report states:

> As pointed out in last year's report, a dirty condition of the scalp is distressingly common among all elementary school children; and a disquieting feature of the existing condition of things is that the neglect of personal cleanliness and attention which causes it is most prevalent amongst the older girls who are near to the time when they will leave school, many for work in domestic service in the houses of the public generally. It should be pointed out that while this condition of the head is very common, a like condition of the body and clothing, which may be attributed to somewhat grosser parental neglect, and is a frequent concomitant of the more squalid kind of poverty, is distinctly rare among school children in East Sussex. It may be pointed out also that already, and working under much less favourable conditions for dealing with the evil than will prevail in the future when the assistance of the district nurse in school medical work has been fully developed, a reduction to the extent of rather more than 12 per cent. in the total number of verminous children has been effected. The improvement is, in reality, even greater than the figures indicate. The number of verminous children has been reduced by 12.5 per cent.; but the gain to cleanliness is somewhat greater, inasmuch as the children who are still in this condition are, as a rule, less dirty in a degree than formerly—there are fewer very bad cases. In dealing with these children the school nurse is invaluable. The teachers have in the past worked very hard to diminish the evil, but their influence is necessarily limited to the school. The nurse, on the other hand, follows the child to her home, and can see that the necessary cleansing is actually carried out. With the more effective organizations of nursing assistance steady improvement should be obtained.

Enlarged Tonsils, Adenoids, etc.

It is pointed out that 11.3 per cent. of the children suffered from enlarged tonsils and adenoids, 9 per cent. from defective vision, while 63 were found to be mentally deficient. An unexpectedly large number of cases of heart disease had been found, associated as a rule with some indications of a general rheumatic tendency.

Tuberculous Infection.

The amount of tuberculous infection generally among school children was relatively small. Out of 14,962 children examined, only 6, or 0.04 per cent., presented symptoms suggestive of pulmonary tuberculosis. All six children were excluded from school. The medical officer states that he was under the impression that the younger adult teachers were liable in a degree somewhat above the average to tuberculosis of the lungs. He had been compelled to advise the retirement of two teachers for that cause during the year. Comparing the figures from other parts of the country, the medical officer observes that, with the exception of Exeter, the East Sussex statistics were far below any other record.

Results of Inspection and Treatment.

Mr. Foulerton sums up the results of inspection and treatment as follows:

> Out of 500 children found at the primary inspection to be in a neglected verminous condition, in nearly every case of the head only, 263 (52.3 per cent.) were found to be either clean or in a distinctly improved condition in this respect within about two months; out of 853 children who at the primary inspection were found in need of definite medical or surgical treatment for one or other illness or defect, 327 (38.3 per cent.) had received the necessary treatment within about two months. The 853 children who required special treatment may be classified thus: 321 children were found with defective vision requiring correction by glasses—within two months 143 (44.5 per cent.) had been supplied with glasses; 373 children were found who required surgical treatment because of enlarged tonsils or adenoids—within 2 months, 140 (37.5 per cent. had received the necessary treatment; 159 children were f und

with other illness or defect requiring medical or surgical treatment—within two months; 44 (20.7 per cent.) had received the necessary treatment.

Children Care Committees.

The medical officer, discussing the means of further improving the health of the children, says:

A system of utilizing local resources in the way of trained nursing having now been initiated, and satisfactory working of the system being now ensured, the next measure for improving the health of the children which I have to bring under the attention of the Education Authority involves the question of the formation of local Children Care Committees. Whilst the general administration of medical inspection must necessarily be centred at Lewes, the carrying out of measures for benefiting individual defective children obviously can be more effectively planned by voluntary local organization. And I would ask the Education Committee to consider whether they can see their way to favour the development of small local committees which will take upon themselves the duty of keeping under observation the children of their district who need special medical attention, and of assisting those parents who have difficulty in obtaining the medical treatment which is necessary. There are certain reasons why such Children Care Associations should be dominated by the local School Managers; and an appropriate local committee would include the Lady Managers and the Chairman and Hon. Secretary of the District Nursing Association, when there is one. Such Committees would probably work in close association with the District School Attendance Subcommittee, and could do an immense amount of good. As already stated, very substantial improvement in the health of individual children has already been effected under the present system of control and help from the central office of the Education Authority; but the good hitherto done is not to be compared with the improvement which could be effected by a few individuals working in each locality on behalf of the children of their poorer neighbours. One such association or committee has been at work for some time in East Grinstead, and only a little personal initiative is required to establish the system elsewhere. The scheme is one which will not involve expenditure of money. It requires only the voluntary help of a few persons in each village, who, for humanitarian reasons, will be willing to give a little personal service to help sick and feeble children, and who, for patriotic reasons, will be anxious to do what lies within their power to assist in checking the increasing prevalence of physical degeneration among the population, which is so ugly a feature of our national life.

Care of the Teeth.

Allusion is also made to the necessity for attending to children's teeth, and it is urged that local Children Care Committees could do most valuable work by promoting the formation of dental clubs for the benefit of school children.

MANCHESTER.

THE MANCHESTER EDUCATION COMMITTEE.

THE total number of elementary schools under the Manchester Education Committee is now 193, with accommodation for 136,000 children. The number of children on the books at the end of 1909 was 120,490, and the average attendance 107,024. The education rate has risen from 11½d. in 1902 to 1s. 8½d. in 1909, and there seems every prospect of a further rise in the near future. The school medical officer has four male and one female qualified medical assistants employed on full time, and one part-time medical assistant employed mainly on infectious diseases. There are six school nurses, one being appointed to each of the medical inspectors and the sixth being engaged in following up cases by visits to schools and homes. The nurses prepare the children for examination, record the heights and weights, examine the heads and clothing, and in other ways assist the medical inspectors. Before an inspection the attendance officers notify the parents of the time fixed and invite them to be present, and also obtain information as to past illnesses of the children. If any defects are found, the parents are notified on a white card, and any treatment required is recorded on sheets, which are either sent to the principal teachers, with a request to use their influence to get the cases attended to, or transferred to other forms and given to the nurses for visitation and report. If a child is not attended to within a reasonable time a second notice is sent on a green card, and, if necessary, a short time afterwards a third warning notice is sent on a red card. If the defects are still not attended to, the parents have either to attend at the education offices, where the medical officer sees them and explains the consequences of further neglect, or they are summoned before the rota and the cases are subsequently followed up.

In accordance with the regulations of the Board of Education, the inspectors examined all entrants between 5 and 6 years of age, and leavers between 13 and 14, and also special cases of various ages which the teachers selected as suffering from some obvious defects. The numbers examined were 8,126 entrants, 9,098 leavers, and 3,492 special cases, a total of 20,716. These numbers only include those for whom a record was kept, but there were several thousand others examined for cleanliness or infectious diseases of whom no record was kept. Defects were notified for treatment to the parents in 2,705 entrants and leavers and 1,840 special cases, but of the latter class records were kept in only 830 cases. By far the greatest number of defects come under the headings of defective vision and eye diseases, enlarged tonsils or adenoids and ear disease. The average time occupied by inspection was seven and a half minutes per child—that is, about eight children per hour.

The average height and weight of the Manchester child is considerably below the anthropometric standard, especially in the poorer districts. For boys of 13 the weight was 76 lb., and the height 54.7 in., the standard being 82.6 lb. and 56.9 in. For girls of 13 the weight was 78.7 lb. and height 55.6 in., the standard being 87.2 lb. and 57.7 in. It was also noticed that the average 13-years-old child who has not got beyond Standard V is shorter and lighter than his rival who has reached the higher standards, and that, while rather more than one child in every two of the first group has some defect, in the latter group one in every three is the proportion. The child with a physical defect is therefore considerably handicapped in the ordinary school career. The mental capacity was found to be subnormal in 967 children, while a further number of 95, or 0.6 per cent. of the whole, were returned as mental defectives. Vision was only tested among the entrants in special cases, but it was noticed that a large number of infants were suffering from strabismus. Normal vision was found in 71.5 per cent. of all the children, fair vision in 15.7 per cent., and bad vision—that is, below $\frac{1}{2}\frac{0}{8}$—in 12.8 per cent. It was specially noticed that the children in the Jewish quarters suffered from myopia to a much greater extent than other children. Otitis media was reported to exist in 589 cases, and special attention was paid to following up these cases. Phthisis cases numbered 108, some of whom were excluded from school, but in other cases the parents were seen and impressed with the necessity of due care. Rickets was found in 420 cases, and a number of the worst were referred for admission to the residential school for cripples. The vast majority of the children had defective teeth, no less than 2,303 having six or more carious teeth. Here the results of notifying the parents were most disappointing, only a very few parents taking any notice of the reports. A very large number of children had enlarged tonsils and adenoids, and it was specially noticeable that many of these children were in standards below their proper position.

The Education Committee does not itself undertake the treatment of the defects, and the parents are simply advised to obtain treatment either through a private doctor or from a hospital. The only exception is that the authority supplies spectacles when parents apply, and according to circumstances the parents pay the whole or part of the cost, or have glasses provided free. In this way 318 pairs of spectacles were supplied at a total cost to the committee of £23, that is, about 1s. 5½d. per pair. In the case of infectious skin diseases, instructions for treatment are given to the parents. It was found in practice that strict adherence to the Board of Education's requirements as to examination of entrants and leavers would mean leaving unexamined numerous cases of defectives of all ages especially submitted by teachers, most of which require following up, as they were evidently in more urgent need of treatment than many of the

entrants and leavers. No less than 641 children were excluded from school by the medical inspectors in addition to many excluded by the teachers, a large proportion of the exclusions being for skin diseases or uncleanliness, while 136 were for infectious diseases. Of the various methods used to ensure that treatment shall be obtained, it is noted that of the 20,716 children examined, the parents were notified of defects in 4,545 cases, 3,043 were referred to nurses for visiting, 596 were named to teachers as needing special care in regard to physical exercises and school work, 1,645 were marked for the teachers to follow up in order to get defects remedied, and 540 were referred to other departments, such as special schools.

The most urgent cases were always referred to the nurses, who succeeded in getting treatment carried out in 94 per cent., this being in addition to cases specially examined for nits and vermin. In the next grade of cases referred to teachers to follow up, a few had ultimately to be referred to the nurses, but 548 were reported as having been attended to. The method of referring cases to teachers is recognized as being much slower than working through the nurses, and the results cannot be said to have been altogether satisfactory. Only 49 per cent. of the cases were taken off the teachers' lists by the end of the year, and even of these less than three-fourths had been treated. This is distinctly a bad result compared with the work of the nurses. Moreover, the greatest dissatisfaction has been expressed by many medical practitioners with the way in which some of the teachers have indiscriminately recommended children to go to hospitals rather than to private practitioners, and no small amount of hospital abuse has been the result. The blame for this can only attach to the Education Committee in so far as it has not supplied sufficient nurses to do the work, and has not given sufficiently stringent orders to the teachers.

Manchester is particularly well off in the matter of special schools, for, in addition to the special day schools, there is the residential school for cripples at Swinton, which has taken 27 new cases during the year; the David Lewis Colony school for epileptics, which has had 9 new cases; the residential school for the feeble-minded at Sandlebridge, which has admitted 8; while a large number of ailing children have had the advantage of a stay at the country school at Mobberley. In addition, many cases are provided for at residential institutions for the blind and deaf.

Ireland.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

The Work of Dublin Hospitals.

the fifty-second annual report of the Board of Superintendance of the Dublin hospitals it is stated that, so far as it is able to judge, the general work done in Dublin hospitals from a medical point of view will bear comparison successfully with that of any other city in the United Kingdom. The Dublin hospitals occupy a leading place as regards economy of management. A return is issued showing that the average cost per bed occupied in the London Hospital is £138 6s., while in the Dublin Meath Hospital it is £56 2s. In the London Royal Waterloo Hospital it is £119 3s., while in the Rotunda in Dublin it is £58 8s. In the London Fever Hospital it is £171 2s.; in the Dublin Cork Street Fever Hospital it is £47 5s. The London Ophthalmic Hospital pays £115 6s. for every bed occupied, while the Dublin Royal Victoria Eye and Ear Hospital only pays £47 1s. The report states that rent, rates, and taxes are excluded from this return, which therefore, having regard to the thoroughly satisfactory way in which patients in Dublin hospitals are fed and cared for, reflects the greatest credit upon their management.

The Board again calls attention to the comparative lack of intelligent attention shown to the large class of out-patients, as compared to that lavished upon those who are treated inside the hospitals. The report goes on to say:

> As far as we can see, the boards of the various hospitals under our supervision are as much impressed with this shortcoming as we are, but they lack funds to develop a thorough system. The spectacle described in St. Thomas's Hospital report is still to be seen in Dublin as in London—of worn-out mothers dragging to and from hospitals week after week stunted children in rags and variously diseased, and, on each return journey, to some dark, damp basement or other insanitary dwelling, hugging a large bottle of medicine, gratefully believing that the science and charity of the twentieth century have done all that is possible for them and their offspring. The question is one of great importance to the State. We refer to it, hoping that it may strike the attention of the public as it does ours, and that the funds necessary to establish a better order of things may be forthcoming.

The report makes it quite clear that the continuance of the system of relying upon medicine when sanitation or hygiene is what is wanted has been abandoned everywhere except in the treatment of "out-patients," and it is high time that it was abolished there. The report describes how an effort at reform has been instituted in London: "In some of the London hospitals an effort is being made to supplement the bottle of medicine by work done by 'lady almoners.' For instance, the authorities of St. Thomas's Hospital have appointed two such officials with assistants. The chief objects of the social work carried out by this department are: (1) To check the abuse of the out-patient department by patients who are (*a*) in a position to pay for treatment, (*b*) too poor to benefit by any assistance other than that obtainable through the Poor Law. (2) To ensure as far as possible that all out-patients to whom treatment is granted shall benefit to the full by that treatment. (3) To act as a connecting link between the out-patient department and outside charities. The establishment of some such system in Dublin would appear to be urgently required to complete the usefulness of the present hospital system. An extract from the report of the lady almoner of St. Thomas's Hospital shows, however, how a wise and experienced woman, aided by the advice of the doctor, can do more valuable work for the sick poor than the dispensaries can ever hope to achieve. The detailed accounts of the inspection of the various hospitals are all of a satisfactory character. The condemnation of the existing present dispensary system and the suggestions for reform are the points of principal interest and importance in the report, as it is a practical question of great urgency.

King Edward VII Memorial.

At a meeting of the board of governors of the Royal Hospital for Incurables, Dublin, held recently the chairman referred to the fact that the board had decided on erecting in the hospital grounds a pavilion to hold 100 beds as an appropriate Irish memorial to the late King and his reign. Irish people knew that King Edward was deeply interested in the beneficent work of hospitals, and that the treatment of tuberculous disease was very dear and near to his heart. He was glad to say that no sooner had the project been mooted than friends began to write sympathetically, and some money came in. A large sum, however, would be required before the pavilion could be completed, and he appealed to all those present to do what they could to make the memorial worthy of the great and good King who had so recently passed away. About £125 had already been subscribed.

Alleged Sweating amongst Out-workers in Belfast.

The Medical Superintendent Officer of Health has stated in his lately issued annual report on the health of the city that "sweating" is undoubtedly one of the main causes of a high death-rate. Immediately preceding this statement he alleges serious "sweating" is found amongst the out-workers in many of the branches of the linen trade, shirt makers, etc. He thus suggests that it is a cause of the high death-rate of Belfast. The question has been promptly taken up by manufacturers, and a deputation from the Linen Merchants' Association waited on the Public Health Committee and denied the accuracy of the charges.

It was stated that employers had difficulty in getting hands, and so the very primary element in sweating was absent. The committee had previously passed a resolution to hold an inquiry into the matter. At the same meeting a second deputation from the Trades Council appeared and upheld the statement made in the report of the medical officer of health; hence considerable feeling has arisen. From a health point of view nothing but good can come of such an inquiry. Certainly some of the instances quoted have not a prima facie look of a living wage; but it is well known that many other factors must be taken into consideration; there is as yet no proof of sweating being general.

Ambulance Calls in Belfast.

From the annual report of the Belfast Fire Brigade we learn that the ambulance service has been most satisfactory; 2,733 calls have been answered, and over 9,000 miles have been travelled. The public ambulance work for accidents is carried out by the Fire Brigade in a most efficient manner; there are annual ambulance classes of the men held, and most of them have gained the certificates or medallions of the St. John Ambulance Association. At the Royal Victoria Hospital an extra stretcher is kept, so that the men leave patient and stretcher, pick up the vacant one which is ready for them, and thus lose no time. Some of their bandaging is exceedingly neat and serviceable.

Extraction of Teeth by an Unqualified Dentist.

It may be remembered that a young girl named Collins lost her life in Bantry a few months ago owing to the fact that an unregistered dentist, belonging to the firm of Messrs. Cole and Co, extracted six teeth when the girl was not in a condition of health to stand the operation, as she was suffering from purpura haemorrhagica at the time. The girl bled to death despite all that medical skill could do to save her. Taffe, the assistant, was tried at the Cork Assizes for causing the girl's death, but the jury disagreed. The father of the girl brought an action against Messrs. Cole and Co., and it has just been settled by Messrs. Cole agreeing to pay Mr. Collins £200 as well as all the costs in the case.

Scotland.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

Edinburgh.

British Medical Benevolent Fund.

The seventy-fifth annual report of the British Medical Benevolent Fund, for the year 1909, is disappointing reading as far as Edinburgh is concerned. Only 20 doctors out of the 370 in Edinburgh contribute, and the total contributions only amount to the paltry sum of thirteen guineas. Aberdeen, with a population approximately half that of Edinburgh, contributes £27 12s.; and Dundee, with a still smaller population, contributes £19. Perth, with a population of 35,529 (the population of Edinburgh is 355,366), contributes £13 14s. 6d. It is to be hoped that this blot to the discredit of Edinburgh will at once be removed. The British Medical Benevolent Fund appeals in a very special way to the medical profession, as indeed no other charitable fund does, and it is to be hoped that means will be taken to bring this home to every member of the profession in Edinburgh before the next annual collection is made.

British Red Cross Society.

The Scottish Branch of the British Red Cross Society has now been separated from the head quarters of the St. Andrew's Ambulance Association, with which it has been associated since its formation, and its new head quarters have been established at 137, Sauchiehall Street, Glasgow. A circular has been issued to all county branches, and all correspondence will now be addressed to the new head office. Lieutenant-Colonel Barnes, Secretary of the St. Andrew's Ambulance Association, recently resigned the honorary secretaryship of the Scottish Branch of the Red Cross Society, and Major C. C. Fleming, D.S.O., R.A.M.C., will shortly take up the duties of Secretary.

Lunacy in Renfrewshire.

Dr. Hotchkis, Medical Superintendent at Dykebar Asylum, in the first annual report of the Renfrew District Lunacy Board, says that during the first year of the institution 309 cases were admitted, 151 males and 158 females. Of these, 216 were transfers from other institutions and 93 direct admissions. Of the latter, abuse of alcohol heads the list of causes. Worry and loss of work accounted for 11 cases, and 11 were senile. Of these latter it is noted that some had been in better circumstances, and had their relatives chosen to put up with some little inconvenience, they would never have been certified at all. The relations between the numbers of adolescent, climacteric, and senile cases are striking, namely, 1, 6, and 11.

Glasgow Municipal Milk Dépôt.

The subcommittee on infantile mortality (one of the subcommittees of the Health Committee of the Town Council of Glasgow) has made a recommendation that, in view of the fact that the cost of preparation of the milk at the dépôt largely exceeds the sum realized on distribution, the dépôt be closed on August 31st. The report also states that there was no evidence as to the special advantage of this prepared milk as a food, that the use of the milk had not extended to the most neglected children of the city as originally intended, and that the numbers using it had been steadily declining. This question had been remitted to the subcommittee direct, and had not been discussed by the Health Committee—an unusual procedure. When the matter came up for settlement at the Corporation meeting on August 18th, the minute embodying the recommendation was remitted to the Health Committee, so that it might have an opportunity of expressing an opinion. The dépôt will therefore go on meantime till this committee reports. The establishment of the dépôt some years ago was purely a tentative one, and was an experiment based on the pioneer work done at Huddersfield. It was not expected to be a commercial success, but was instituted in the belief that the pure milk supply would tend to reduce the high infantile mortality among the very poor. The trouble lies in the fact that this class is not reached, and that the dépôt is used mainly by those who in any event would take proper care of their children. It is claimed that under the Notification of Births Act the authorities can now obtain better supervision of infants, and that this is of more importance than the milk supply; and that while pure milk is still a necessity, the elaborate and expensive machinery of the municipal milk dépôts is unnecessary. The money spent on the experiment has not been lost altogether, because all experiments on such lines are informing. But whether the continued expenditure would be of advantage to the public health of the city is the point which will come up for discussion, and, in view of the report of the medical officer of health, the municipal milk dépôt is likely to be closed before the end of the year.

Glasgow Corporation and Bellefield Sanatorium.

At the meeting of Glasgow Town Council on August 18th Councillor Dr. McConnell took exception to a minute of the City Finance Committee, giving the renewal of a grant of £200 to Bellefield Sanatorium. Dr. McConnell submitted that the grant ought to be increased to £500, and he asked that the minute should be reconsidered by the committee. They were spending £150,000 per annum on the treatment of fevers, yet in the city the death-rate from consumption was as big as from all the fevers put together. The Corporation contributed only £3,000 per annum in connexion with consumption, and when the Bellefield management were in straits financially he thought £500 at least should be granted. The treasurer pointed out that the renewal of the £200 was all that had been asked by the

management, hence the limited sum. In view of this explanation the minute was carried by the narrow majority of 23 to 20. The feeling was distinctly in favour, however, of something more being done, and when the renewal next year is brought up it may be taken for granted that no limit will be put on the generosity of the Corporation so far as the Bellefield management is concerned. The city is morally bound to do much more for the prevention of tuberculosis than it does at the present time, and Dr. McConnell is to be congratulated on bringing the matter up.

THE SANITARY CONGRESS.

The thirty-sixth annual congress of the Incorporated Sanitary Association of Scotland will be held in Elgin from August 31st till September 3rd. Mr. Robert Lindsay, Chief Sanitary Inspector of Midlothian, is the President, and his address will deal with the march of sanitary science. The subjects to be discussed during the congress include human carriers of typhoid and other zymotic diseases; public baths; the need for co-operation in certain phases of local government; smoke pollution of the air and what should be done to prevent it; practical points in the control of pulmonary tuberculosis; and social problems in relation to public health. The annual report submitted by the council states that two examinations in sanitary science were held during the past year. One was held in Edinburgh, where out of 17 candidates 11 passed. The other was held in Glasgow, when 28 passed out of 39 candidates presented. Three examinations in the inspection of meat and other foods were also held, two in Glasgow and one in Edinburgh. The Glasgow delegates taking part in the congress are Dr. A. K. Chalmers, City Medical Officer of Health; Councillor Dr. C. R. Maclean; Mr. P. Fyfe, Chief Sanitary Inspector; Mr. John Lindsay, Town Clerk Depute; and Mr. W. F. Anderson, ex-Convener of the Health Committee of Glasgow Corporation.

Correspondence.

THE FUTURE OF THE ASSOCIATION.

SIR,—What has the Association done for me? This is the perennial cry of certain members of the profession. Should not the question rather be: What have I done for the Association? The answer to the first question is a very great deal; to the second is very little.

Let us consider the interest taken by members in the Divisional meetings of the Association. A few regular attendants turn up and transact the business of the meeting; the majority remain at home and then write about oligarchy and democracy.

The interested members form the accursed oligarchy, the absentees represent the democracy. Then we have an annual meeting, a most important feature of which is a preliminary lunch. Upon this occasion the democracy is well represented.

Then comes the election of officers for the ensuing year. You might expect the downtrodden democrats to storm the citadel and drive out the oligarchy. I regret to say that the experience of most Divisions is that the difficulty in filling these posts is not of selecting the best men from a number of candidates but in finding a sufficient number of men willing to take the posts.

The solution of the problem of how the Association can best help its members is simple in the extreme and it is this: Let individual interest in medico-political matters replace individual apathy and let us all pull together.—I am, etc.,

Bedford, Aug. 16th. S. J. ROSS.

SANATORIUM TREATMENT OF CONSUMPTION.

SIR,—I am not certain that you will thank me for a further letter on this subject, but I must again emphasize the statistician's view, because I cannot see how if reports are made up, as Dr. Paget-Tomlinson advocates, we can use them for investigating the real influence of sanatorium treatment. I will accept the view that the sanatorium can do little good to extremely advanced cases, but to compare the mortality in pre-sanatorium and post-sanatorium days we must have statistics of *all* types of cases. At best the classification of cases must involve some personal equation, and even this personal equation may fluctuate from year to year. "What shall I include in my return?" is a question which the medical man may not answer yearly in the same way. I venture to illustrate this from the *Reports of the Westmorland Sanatorium*, the fifth (1905), the seventh (1907), and the tenth (1910), copies of which Dr. Paget-Tomlinson has most courteously sent to me. I do not do this in any spirit of aggressive criticism, but to indicate how difficult it is to pronounce a real judgement in the matter until the statistical side is fully appreciated. In the 1905 report there appears the following classification of 224 cases:

A. Consumption slight, 55 cases.
B. Consumption moderate, 62 cases.
C. Consumption advanced, 67 cases.
D. Consumption seriously complicated, 19 cases.
E. Rejected as hopeless, 21 cases.

The last cases, although admitted to the sanatorium, all died within a few months.

According to the 1910 report, 309 cases in all were admitted during the years 1900 to 1904 inclusive, so that already in 1905, 85 cases appear to be entirely omitted from the record.

In the seventh annual report (1907), Classes A, B, and C appear as above, and contain 65, 89, and 92 cases respectively, or 246 cases out of the 479 admitted to the sanatorium up to this date. Thus 233 cases remain unrecorded.

In the tenth annual report (1910), Classes A and B alone are recorded. But Class B, which up to 1907 was called "consumption moderate," is now termed "consumption severe," although the same original individuals are embraced in it. Up to 1909, 909 persons had been admitted to the sanatorium. Of these patients we find a record solely of 81 cases of "slight" and 129 cases of "severe" consumption, or only 210 cases of the 909 patients treated in the sanatorium are considered in 1910 worthy of record. Thus, in the course of ten years, from a knowledge of 72 per cent. of after-histories, we have passed through 51 per cent. to only 23 per cent. of cases for which the after-history is published. It may be that these 23 per cent. are the only cases to which sanatorium treatment would be of advantage, but it will, I think, be clear that such a classification cannot provide us with actuarial data as to the mortality of the several classes of the tuberculous.

But the changing opinion as to what categories of patients it is desirable to enter upon the record extends to the severity of the disease in the patients themselves. It is not only that patients with "moderate consumption" in 1907 may be held to have had "severe consumption" in 1910, but that individuals who were classed as having "slight" or "moderate" consumption in 1905 or 1907 may have disappeared altogether from the record in 1910. As no patient has been lost sight of, this must mean that a different judgement has in the interval been formed of the severity of their attack, and that they have been transferred from Classes A and B to Classes C, D, or E.

In 1905 the A and B classes, 1900–4, contain 117 individuals; in 1907, 113 individuals; in 1910, 111 individuals. In 1907 the A and B classes, 1900–6, contain 154 individuals; in 1910 they have shrunk to 137 individuals—and even one of these seems to be a transfer, for a male, an "invalid" after discharge, appears replaced by a female, a "hospital nurse," with a quite different record. What has become, then, of these 18 individuals, of whom 13 were "severe" cases, who have disappeared from the record between 1907 and 1910? Three at least I know to be dead; what about the other 10? The disappearance of 13 cases—3, and quite possibly more, of which may be deaths, renders it very difficult for the actuary to be certain of his ground. For example, the 1902 class of "moderate consumption" consists of 16 individuals of whom 7 were dead in 1907; but the same 1902 class in 1910 consists of only 14 individuals of whom 7 are returned as dead—that is, 50 per cent.; but the 2 omitted individuals were two who had died in the 1907 report, so we have really 9 died out of 16 in 1910—that is, 56 per cent., a considerable difference. The system of record has somehow been modified.

It is true that the inclusion of the advanced and hopeless cases in the sanatorium reports—cases for which the advocates of the treatment admit nothing can be done—may produce by its ghastly record a bad effect on the public mind. But without a knowledge of the 77 per cent. of *unrecorded* cases, and without a knowledge of why initially recorded cases disappear from the record, no definite judgement can be made of sanatorium treatment from the actuarial standpoint.

As I have said, my object is not to criticize sanatorium reports. Most sanatoriums are charities and possibly they cannot afford to frighten their subscribers. But my appeal is to the medical committees of these sanatoriums. Somewhere in the archives data ought to be preserved from which it would be easy to ascertain the after-history of every single patient admitted and some idea of how many cases have on the ground of their advanced condition been refused admission.—I am, etc.,

KARL PEARSON.

Biometric Laboratory, University College, London, Aug. 17th.

SIR,—I am afraid my friend Dr. Pakes has not read my letter (August 13th, p. 406) with that care which is his usual wont.

I am not adverse to sanatorium treatment, but what is known as the "open-air treatment," when patients are exposed to open air day and night, in a cold, damp climate, like we find in most parts of Great Britain. It is quite a misfortune that this treatment has got to be known as the sanatorium treatment. An example of it is furnished by Dr. F. S. Toogood (*Tuberculosis and the Poor Law*):

> When the wind blew in a certain direction the rain could not be kept off the beds, and in these circumstances the beds were covered with mackintosh sheets, leaving the faces of the patients uncovered. After a heavy fall of snow last Christmas, there were 6 in. of snow on the beds in the morning.

Could anything be more unscientific and cruel? What possible good could 6 in. of snow on the bed do? I have more than once stated this open-air cure may be beneficial in a dry climate of equable temperature (Canary Islands, California, some parts of South Africa, etc.).

I am sorry Dr. Pakes casts ridicule on the instincts of animals and birds. I place a sublime trust in Nature, and always go to Nature to solve any problem. I am not the only physician who has found the open-air treatment adverse to the patient. A practitioner, writing in the BRITISH MEDICAL JOURNAL (February, 1905), says:

> During the past three years it has been my unhappy experience to have seen over 50 cases of phthisis, 38 of which had been *cured by the open-air system*. Fourteen have been treated for some months, all of them *either dying* (the italics are mine) or in too far advanced a stage of the disease to be benefited by treatment.

I did not write, as Dr. Pakes suggests (August 20th, p. 495), that I believe patients are cured by "suggestion," although I support the patient's view to a great extent.

I may add, in conclusion, I have always supported the educational part of the system, the rest, good hygienic condition, scientific diet, and general discipline of these establishments, and if they were placed in healthy, dry, warm places (there are many spots in Great Britain with all these advantages), well sheltered and an abundance of sunshine, where the patients were not allowed to be exposed either day or night to cold, damp air, I would give the treatment my hearty support. I would, however, add my pious opinion that it is very bad to congregate consumptive patients together; they should be housed in inexpensive bungalow cottages, separated by a good strip of garden, each cottage to house not more than 6 cases. I would also recommend to country practitioners the excellent effect of the sun rays used by me for over twenty years.—I am, etc.,

London, W., Aug. 19th. THOMAS DUTTON.

"MODERN MIRACLES OF HEALING."

SIR,—In your issue of August 20th you publish an instructive article by the Right Rev. Abbot Gasquet on the Catholic Church and the Lourdes cures. The Abbot postulates for an alleged cure to be received as miraculous the following: (1) That the disease cured must have been of an aggravated nature, difficult or impossible to be cured in the ordinary way; (2) that the condition of the patient before the cure showed no sign of mending; (3) that no medicine had been used or, if it had, that it had done no good; (4) that the cure was sudden; (5) that the cure was complete; and (6) that it was permanent.

About fifteen years ago, when I was still in practice in Calcutta, I was the active agent of a "Lourdes miracle," which fulfilled all these six essentials, and which, I believe, caused some sensation in the Indian Roman Catholic world. A short account of the case may be of interest in connexion with the subject.

I was seeing patients at my house when there entered my consulting room a nun and my servant, supporting between them another young nun, of about 25 years of age, whose head was rolling from side to side, her features twitching, her arms limp, and her legs flying out in front of her, or dragging behind, in a pitiful attempt to walk across the room. I watched the procession from the door to the chair in which the poor girl was deposited, and I need hardly say that the nature of the case was practically clear before a word was spoken.

The two girls were Irish nuns, and the companion of the patient, who acted as spokeswoman, told me that they had come all the way to Calcutta from their convent in the south of India (Madras Presidency), as they had heard that I had successfully treated similar cases—an unmerited attribution I may say, in passing. The girl, it seemed, had been suffering from "paralysis" for several years, she had shown no signs of improvement, her life was a burden to herself and her sister nuns, numerous doctors had been consulted, and much treatment been undertaken, with no result.

This history fulfils the conditions Nos. (1), (2), and (3) mentioned by Abbot Gasquet.

The two nuns implored me to hold out some hope of relief, as I had listened to their tale almost in silence, thinking *what* a case it would be for Lourdes. I then said to the patient, "Yes, you can be cured absolutely, without the shadow of a doubt, if you will do what I tell you, and that is, to make the pilgrimage to Lourdes; more than this, it is a heretic, in your opinion, who gives you this advice, for I do not belong to your Church."

They were greatly disappointed at this, as they said their community was a poor one and the necessary expenditure quite beyond them. They asked if drinking the imported Lourdes water would not have the same effect. I said I doubted this, for as much merit was acquired and benefit gained by the actual pilgrimage to the holy spot as by the actual drinking of the waters. What I meant, of course, was that the *entourage*, the approach to the far-famed spot, the exaltation and excitement of fellow pilgrims, the pervading mysticism and expectant atmosphere of the holy place itself would be of powerful assistance in effecting the cure. In the end it was settled that she should drink bottled Lourdes water daily in the Calcutta Convent in Middleton Row, and see me again within a fortnight. I merely prescribed a simple tonic, and much doubt if the prescription was made up.

About ten days afterwards, during my consultation, the same two nuns entered my room, and the formerly "paralysed" one rushed across the room and fell at my feet, embracing them, and saying I had cured her. When she was seated I asked her to tell me all about it, and in her own words this was the story:

"We returned to the convent and told the Revd. Mother all you had said, and I immediately began to drink Lourdes water and to do 'a neunaine' (novena—nine days' prayer). On the ninth day I was lifted into a carriage to do a drive with the Revd. Mother. While we were out I suddenly felt my strength return; I stood up and cried out, 'Mother! Mother! I am cured.' We drove back at once to the convent; I *leaped* out of the carriage, saying, 'I am cured! I am cured!' All the nuns speedily assembled, and we went into the chapel and there sang a Te Deum to thank the Holy Mother *and you, doctor*, for my cure."

I must say I was touched as well as taken aback by the sweet simplicity of these two good women in the way they associated me with the cure and their thanks.

With regard to Abbot Gasquet's postulate (4), the cure here was sudden. It took place during a drive on the ninth day. Postulate (5): the cure was complete, as I found when the girl returned to see me. As far as I know

it was permanent—postulate (6)—for I have never heard to the contrary, though I had frequent communications with the Roman Catholic sisterhoods and priests in Calcutta till I left in 1900. Also, for some time after, I used to get letters from various parts of India asking about the "miracle." Indeed, there was no reason why a condition of pure hysterical paralysis such as this was should return.

I refrain from comments, as my letter is already long, and they are needless.—I am, etc,

C. H. JOUBERT DE LA FERTÉ, M.B.Lond., F.R.C.S., Colonel I.M.S.,
Formerly Professor of Gynaecology, Calcutta Medical College.

Weybridge, Aug. 21st.

SIR,—Day by day the claims of "religious healing" become more pressing, and the important papers upon this subject published in the BRITISH MEDICAL JOURNAL prove how essential it is that medical men shall face the situation.

Prayer has been a dominant factor in the conduct of all religious observances from the earliest times, and, indeed, no faith in a Supreme Being could be counted rational which did not include amongst its essential tenets the invocation of that Deity.

Obviously prayer can mean nothing to the atheist and little to the agnostic; to all other classes of the community it is a subject of most vital importance, and I venture to suggest that it is the keynote to the whole subject of the relationship between religion and medicine. On this question the honest man is met by a difficult problem: How is he to avoid the Scylla of cant and fanaticism without being dashed to pieces on the Charybdis of absolute neglect?

A very large proportion of our profession cannot be classed either as atheists or agnostics; they are members of some "religious body," and as such make use of and profess to believe in the efficacy of prayer.

The Church of England claims a very large number of medical men, not only as seat-holders but also as church officials. Over a very small area in the South-East of London I can count five churchwardens, and many more sidesmen and church helpers. It is absolutely inconceivable that these men, educated and well read, make use every Sunday of prayers in which they have no faith; yet it is an undeniable fact that a large percentage have dissociated this religious belief from their daily work.

Here is the root of the evil; the materialistic tendency of the age appears to have tainted the work of the medical profession, and in consequence certain religious bodies seek for a remedy in the "scriptural practice of Divine healing."

The steady increase of functional disorders has played an important part in bringing about this crisis, and in certain cases has justified the means by successful results. There is far more in this question, however, than a mere appeal to suggestive treatment, for it involves the whole problem of effective supplication to a Supreme and Omnipotent Being.

It is important to remember that this Supreme Being works His will very largely by natural means, and in no case is man justified in neglecting such means in favour of the supernormal or miraculous.

The beautiful and orderly scheme of evolutionary creation is a lesson which can hardly be neglected.

By much inspired work and noble self-sacrifice medical knowledge has reached the eminent position which it now occupies, and it is inconceivable that such ability could have been granted to man, were it not for the welfare of the race. Surely it must be culpable presumption to strive to replace so Divine a gift by an appeal to a remote period when medical science was at a very low ebb.

The present state of public feeling is, however, a serious warning to the Christian members of our profession.

The efficacy of prayer is an undoubted fact, borne testimony to by men of all ages, and no medical man is justified in neglecting such a powerful assistance in his work. I do not mean to advocate that the medical man shall usurp the clergyman's place at the bedside of his patient; such a course is open to many objections, and only in certain cases is it advisable; a suggestive aspect attaches itself to certain prayers, and especially to those of an emotional type. Above all things it is necessary to face this question in a practical way. Prayer and faith are no excuse for slovenly work, neglecting means of keeping up to date, or for a cowardly shirking of responsibility. Most of us have heard the story of the doctor who, when confronted with a severe case of *post-partum* haemorrhage, retired into the next room to pray; it is impossible to conceive a more unjustifiable and illogical procedure, in that he neglected the means of safety granted to the woman by centuries of medical experience in favour of an appeal to miraculous intervention. Finally, I would plead for the co-operation of medical experience with religious conviction as the only rational means of coping with the protean conditions resulting from an age of unrest and excitement.—I am, etc.,

S. HERBERT DAUKES, M.B., B.C.

Beckenham, Aug. 21st.

SPIRITUAL HEALING AND THE "GUILD OF HEALTH."

SIR,—In your last issue there was a criticism of the Guild of Health by Dr. Stanley Bousfield, which concluded with a warning to all and sundry to avoid the guild as a harmful society. If there is no such thing as "spiritual healing" then plainly Dr. Bousfield is right, and he need not have argued the point. But if he wishes to criticize the guild he might, at any rate, be accurate in his statements.

1. The guild neither possesses nor claims "healing powers." It neither supplies nor recommends "healers." Indeed, it has nothing whatever to do with the supply of healing; and therefore does not increase its membership by the offer of anything "novel or fresh for the ailments of themselves and their friends." So far as healing is concerned there is nothing whatever to be gained by joining the guild.

2. If any of its members endeavour by prayer, imposition of hands, or holy unction to help sufferers they do it entirely on their own account, and receive no recognition of any kind from the guild. The only regulation we have ever made in regard to such is that they are absolutely forbidden to charge any fee of any kind whatever. Beyond that we neither authorize nor forbid: it is outside our work.

3. Neither is our membership increased, voluntarily, by the report of "cures," because cures are never reported.

4. Dr. Bousfield's account of a case of myasthenia is not less misleading. No one could possibly have taken more trouble than I did to secure that the lady in question should obey in every respect the directions of her medical advisers. The chief direction was that she should not over-exert herself. I warned her continually to obey this direction most precisely. The "treatment" may have been "improper" in Dr. Bousfield's opinion, but the result of it was that the lady left me a good deal better, both physically and spiritually, than when she came, and is still improving. Wherein my "great responsibility" lies I do not know. And I do not see what objection any Christian who believes in prayer can have to what I did.

5. I can assure Dr. Bousfield that I am doing exactly what he wishes, namely, "working quietly in my capacity as a clergyman under proper conditions in conjunction with medical men." I neither call myself nor wish to be called a "spiritual healer"; I merely attempt to supply that contribution of spiritual energy in the work of healing sick people which the Church ought to supply, and which I believe the majority of sensible Christian doctors would welcome.

I regret that your columns should be troubled by this almost personal controversy. I only offer this correction of Dr. Bousfield's misleading article in justice to the guild, which is quite unconcerned with anything I may do, rightly or wrongly, in my private capacity, and whose sole aim is to set forward that harmony between religion and medicine which is the hope of every sincere Christian heart.—I am, etc.,

FRANCIS BOYD,
Warden of the Guild of Health.

Clifton, Aug. 20th.

SHIP SURGEONS.

SIR,—The concluding paragraph of Dr. Heywood Hadfield's excellent descriptive letter anent the work of ship surgeons, recently published, is a little unfortunate. He does not seem to have appreciated the fact that Dr. John F. Elliott's committee is not working alone and

unaided, but under full sanction of the Medico-Political Committee of the British Medical Association. Reference to the open letter published in the JOURNAL of July 9th will show that this is the only means by which ship surgeons can be brought under the wing of the parent Association.

The work of the present committee consists solely in finding out for the Medico-Political Committee whether ship surgeons are desirous of obtaining representation. It is the results of this investigation alone which will influence the Medico-Political Committee to further action or not in the matter, and there is no suggestion whatever of "a warlike committee" in the present association of men, who are, so to speak, only tilling the ground for the harvest.

As Dr. Hadfield rightly says, there is no reason or wish on the part of any one to embarrass friendly relations between shipowners and the profession, but at the same time he also admits the business side of the question as far as owners are concerned, while ignoring that of the medical profession. Until this same side is granted to the "medicos" no satisfactory state can be arrived at.

Dr. Hadfield seems to be unduly optimistic, not to say somewhat altruistic, on the subject of reform—admittedly desirable—obtained through individual private enterprise. The experience of others in this respect does not coincide, and, further, it is not the experience of the world in general. Some little while ago the surgeons in one steamship company presented a petition for improvement of conditions, etc. All they obtained in response was the statement that the surgeons employed in a competing line were perfectly satisfied.

With regard to the "aims" of the committee, I do not think any single one unjust or unreasonable, and my own seagoing experience of six years has more than once shown the necessity for adequate hospital accommodation for all sorts and conditions on board in view of the existing merchant shipping laws.—I am, etc.,

London, W., Aug. 12th. A. VAVASOUR ELDER.

THE ETIOLOGY OF IRITIS.

SIR,—Mr. Worth's letter on this subject upholds views upon the etiology of iritis which must find support among many, both specialists and general practitioners, who have given thought to the matter. A certain school of ophthalmologists would banish the term "rheumatic iritis," and tell us that those cases which have been so termed are almost all of venereal origin. Mr. Kenneth Campbell asks, "Whoever saw rheumatic fever complicated by iritis?" The answer is, No one has recorded a case. But how many rheumatic individuals who suffer from "chronic rheumatism" have ever had rheumatic fever? The answer is—not a large proportion. Rheumatism is a general term, and includes a large number of cases of obscure joint lesions and myalgias due to some form of intoxication. It may be gonococcal intoxication, or an auto-intoxication from intestinal or oral sepsis. The final result may be obscure rheumatism or definite osteo-arthritis, and these conditions are complicated with iritis. A case of osteo-arthritis associated with iritis is recorded in the *Ophthalmoscope* for January, 1908, by Dr. Burt, and is illustrated by diagrams of the affected joints.

It is impossible to agree with Mr. Kenneth Campbell when he states that bilateral iritis is always syphilitic in nature; gonorrheal iritis is frequently bilateral. Byers, in his study of *The Ocular Manifestations of Systematic Gonorrhoea* (Montreal), gives the figures in first attacks as —monocular 48 cases, binocular 23.

I am in full agreement with Mr. Worth in ascribing at least 50 per cent. of all my cases to septic intoxications, especially bad teeth; remove the teeth and the iritis often clears up. I feel convinced that tuberculo-toxaemia plays an unsuspected part in many examples of irido-cyclitis. Many of these cases recover rapidly under treatment with tuberculin. One sees iritis in private patients, young unmarried ladies of unblemished reputation, where a venereal etiology is absolutely out of the question, and many of them are associated with "rheumatism." "Rheumatic" is such a vague term that it would be better to call the cases "autotoxaemic" than rheumatic.—I am, etc.,

Leamington, Aug. 16th. T. HARRISON BUTLER.

SIR,—Mr. Claud Worth appears—for his statements are somewhat indefinite—to base his conclusions chiefly on private cases. The question under discussion is the "etiology of iritis," not the "etiology of iritis in private practice." Without a doubt, syphilitic iritis is rare in private practice, and the explanation thereof is plain: Private patients are usually intelligent, recognize the possibility of their danger, therefore come under general treatment early, and so do not often contract iritis. *Per contra*, with the poor the matter is different.

I am quite unconvinced by Mr. Worth's argument anent constipation, indigestion, putrefactive processes in the bowel, etc. Obviously it is open to the objection of the *post hoc ergo propter hoc* fallacy. My own experience is that constipation, etc., is the normal condition of adult town dwellers.

I still maintain that to elicit a history of syphilis is often a matter of considerable difficulty. The late Dr. Hilton Fagge, one of the shrewdest of clinical observers, in his classical work on *Medicine*, said that three diseases are often missed: phthisis, scabies, and syphilis—phthisis because it is not looked for, scabies because it is overlooked, and syphilis because it is forgotten.—I am, etc.,

London, W., Aug. 14th. KENNETH CAMPBELL.

SICKNESS AND INVALIDITY ASSURANCE.

SIR,—The keen interest taken at present in the various schemes for medical reform is evidenced by the many letters on the subject in the correspondence columns of the JOURNAL, and this must be my excuse for attempting to answer some of the issues raised.

It is stated by Dr. Bruce C. Kelly that if a State medical service were instituted, the State medical officer would take over a certain proportion of the work done by the general practitioner, which would mean a drop in capital and saleable value of practices. Now where does Dr. Kelly think the new State medical officer is going to come from? He cannot drop suddenly out of the air from nowhere; the men now in practice are going to be the State medical officers, and there is work enough in all conscience to supply the whole of them. There is no reason why they should not be paid an income as State medical officer for work done for the poorer classes, and carry out paid work for the wealthier classes also. Supposing, however, that less than the whole of the profession entered on full-time work for the State, then these men would give up their practices, and although the work paid for by fees was lessened, the number of men doing it would be lessened also, so that the value of those private practices remaining would not decrease. As for the men who entered upon State work, they would have something better than the sale of a practice behind them. In case of sickness they would have sick pay, and at 65 they would retire on a pension. Let Dr. Kelly ask any of his friends in civil or military service for the State whether they would like to exchange their pension or position for a sum of between one and two years' annual value, which is about all that a practice will bring in. Dr. Kelly seems to suppose that the proposed Government sickness and invalidity insurance is an alternative to a State medical service. On the contrary it is the forerunner of it, the first step towards it. That is why it is so important to get it on proper lines.

Dr. Halstead, without much evidence, comes to the conclusion that the sickness and invalidity insurance is to be a poor miserable thing, of no service to anyone but the army of parasites that exist on the weekly collections of the working classes. In the opinion of others, it is the first thing which will disband and scatter that army, and all its squalid train. Surely it is too soon to throw discredit on a scheme honestly intended to do good, while it is still unborn—to attempt to procure abortion of it, so to speak. Let the babe come, and let us render the best professional services we can at its birth, guard its health after its arrival, train it up in the way it should go, and it may not turn out such a bad bantling after all. Meanwhile, do not disparage its parentage by speaking of it as "the German medical contract scheme of Messrs. Burns, George, Churchill, Rigg, etc.," for Messrs. Balfour, Law, Chamberlain and Long would be very proud of the honour of standing godfather to it, as Dr. Halstead must know, if he has been following the House of Commons debates on

social reform; while the Archbishop of Canterbury and his whole Chapter are ready to baptize it and give it the blessing of the Church, as witness their recent deputation to the Government.

Seriously, this scheme is not political in its aspect and has a full tide of public opinion behind it, so that to ask, as Dr. Halstead does, the 40,000 medical practitioners to oppose it, is merely to ask them to butt their heads against a stone wall.

A closely allied subject is the recent debate at the Association meeting on the Poor Law Reform, opened by Mrs. Sidney Webb, and it is quite delightful to see Dr. Major Greenwood admitting (in combating Mrs. Webb's arguments) that the main propositions are correct, but that they hold for all medical practice in the lower classes. Precisely; that is the point, and that is why we require a liberal scheme of State sickness and invalidity insurance, working up as it must to a national medical service.

The authors of the Minority Report—and the Majority Report too, for that matter—merely think that things are a little worse in the Poor Law part than elsewhere; otherwise we agree with Dr. Greenwood that the failure to provide treatment at all for many cases, and to reach others at the incipient stage, applies to all medical practice at the present time. The case for a national medical service could not be more neatly or concisely put by any one.

The last point to which I shall refer is that of State hospitals. It is pleasing to me to note that one who takes so much interest in public affairs as Dr. McWalter approves of the principle, but I would venture to point out that no *real* sum of money is required by the scheme.

The money for the 3,000 beds of the Dublin hospitals has to be collected already; it is only necessary to collect it in a different way. From the generous hearted, both rich and poor, it is now begged in the most barefaced manner as so-called voluntary charity. Let us make the churl and miser pay his share also, distribute the burden all round, so making it lighter, and arrive at a proper hospital system.—I am, etc.,

Birkenhead, Aug. 22nd. BENJAMIN MOORE.

THE LATE MRS. MARY MARSHALL, M.D.

SIR,—In the obituary notice of the late Dr. Mary Marshall in this week's JOURNAL, I see that an important and creditable incident of her career has been omitted.

When Dr. Mary Marshall presented herself to receive the degree of M.D. of Paris, the Vice-President of the Académie de Médecine, Professor Hardy, after referring in most complimentary terms to her thesis on mitral stenosis as an original and painstaking work, addressed her as follows:

> Mais il y a un autre point sur lequel je désire vous offrir mes félicitations. Il y a quelques années on a beaucoup discuté si les femmes pouvaient être admises aux études médicales. . . . J'ai trouvé en vous une réponse à toutes les objections de vos adversaires. . . . Vous avez conquis le droit pour les femmes d'étudier la médecine. . . . Vous avez contribué à la solution d'une grande question sociale.

It seems to me that so appreciative an address should not be left unquoted in the record of a useful, laborious, and beneficent professional life. In all great social changes the pioneers are rightly praised, but those who, by their qualities and achievements, help to make the new order of things acceptable and appreciated ought not to pass out of the arena without some recognition of the services they have thus rendered.—I am, etc.,

London, N.W., Aug. 19th. GABRIELLE ANDERSON.

SIR,—In your obituary notice of the late Dr. Mary Adamson Marshall, the information you give regarding her antecedents is rather vague, and hardly does justice to the stock she came of, or the country that had the honour of giving her birth.

Her father, the Rev. Dr. Alexander Anderson, was a clergyman of the Church of Scotland, and minister of the parish of Boyndie, in Banffshire. At the disruption of 1843 he left the Church for "conscience sake," as you rightly express it, resigned his living, and joined the Free Church, which then came into existence. Afterwards he left the Free Church, and entered the Baptist communion. Except that he continued to preach occasionally, he abandoned clerical work, took up education as a profession, and started in Old Aberdeen the private residential school, which, under the name of the "Gymnasium," became famous throughout the north-east of Scotland. To have been a pupil at the "Gym.," as it was familiarly called, conferred a sort of distinction on a boy. Besides his successful work as a schoolmaster, the good that Dr. Anderson quietly did in helping and encouraging the sons of parents whose means were small was said to have been very great. The lady who became his wife and the mother of Dr. Mary Marshall, was Miss Gavin, daughter of Dr. Gavin, of Strichen, Aberdeenshire, who was succeeded in his practice by his son, her brother. The two Gavins, father and son, were highly accomplished men, and noble specimens of the country doctor of the old school.

The Rev. Dr. Anderson had a large family. One of the sons became the husband of Dr. Elizabeth Garrett. Another is Dr. Ford Anderson, of London, a well-known and much-esteemed member of the profession.

The Rev. Dr. Anderson's brother, Mr. James Anderson was head of the firm of Anderson, Anderson and Co., of the Orient line of steamships, and two of his sons, brothers of Dr. Mary Marshall, were leading members of that firm.—I am, etc.,

Oxford, Aug 22nd. JAMES NEIL, M.D.

Medical News.

FOUR new medical members were recently elected to the Hungarian Parliament, making a total of seven physicians at present in that legislative body.

THE fifth International Congress of Thalasso-therapy will take place at Kolburg in 1911. The President of the Organizing Committee is Professor Dietrich; the Vice-president, Dr. Rochling.

AN Arab Sheik, Hamed Waly, who is lecturer on the Arabic language in the Berlin Oriental Seminary, has been awarded the degree of doctor of medicine. This is said to be the first time that an Egyptian scientist has received a German University degree.

THE fourteenth Flemish Physical and Medical Congress will be held at Antwerp next month. In connexion therewith an International Scientific Exhibition will be held from September 17th till the 25th. This exhibition will include a physico-chemical section, biological and medical ones. For all particulars application should be made to Dr. G. Van der Gucht, Cuylitsstraat, 11, Antwerp.

A SHOCKING tragedy occurred on August 16th at Kingsand, a seaside village near Plymouth Sound. Major J. H. Nicholas, a retired officer of the Royal Army Medical Corps, was killed by his son, aged 26 years, with an Indian knife, whilst searching the house for supposed burglars. It appears that the son, who has only recently returned from New Zealand, where he had been sheep farming, had been a patient in the Auckland Mental Hospital. At the subsequent inquiry a verdict of wilful murder was returned against the son James. Major Nicholas entered the Army Medical Service in July, 1880, and retired therefrom in July, 1898. He held the degrees of Edinburgh and Dublin.

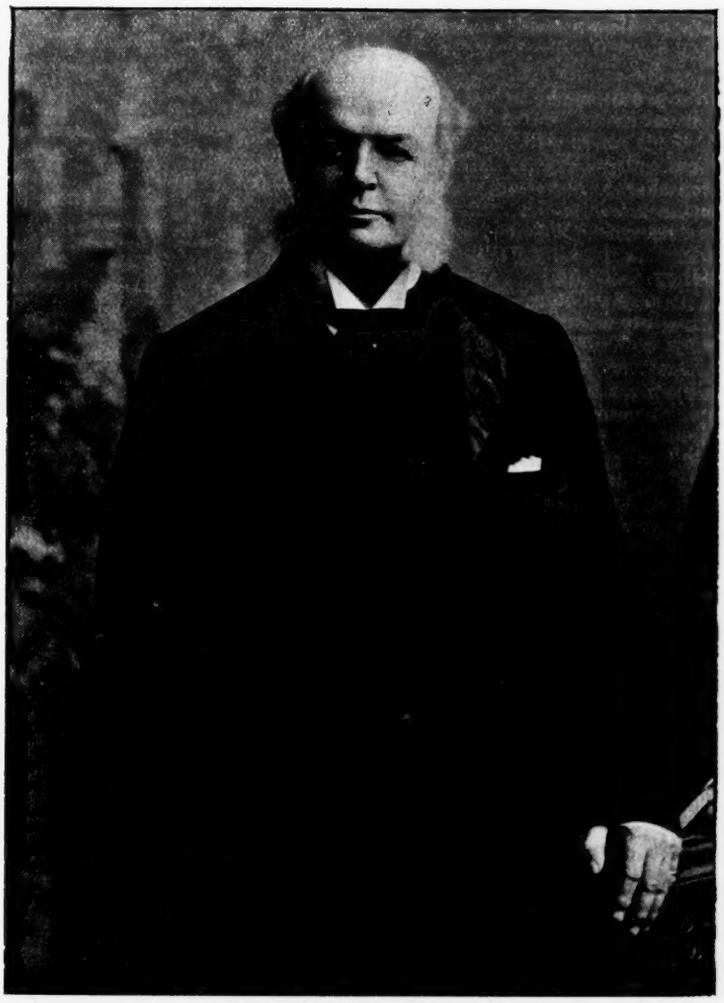
AT a public meeting held at Lymington Spa on August 8th, Dr. T. W. Thursfield had conferred upon him the freedom of the borough; this is an honour to which only three other persons have so far been deemed entitled. The parchment scroll containing the resolution of the Town Council to add his name to the brief roll was presented to him in a large and very handsome silver-gilt casket. Among other decorations it bears on various shields engravings of the town hall, the free library, the pump room, and the Warneford Hospital, these being the institutions in connexion with which Dr. Thursfield has been more especially prominent. Dr. Thursfield, who became M.D.Aberd. in 1860 and F.R.C.P.Lond. in 1890, has been in practice in Leamington since 1865. He joined the council of the borough in 1885, has occupied the mayoralty twice, and is still serving his townfellows as alderman and justice of the peace. Dr. Thursfield is also senior physician on the staff of the Warneford Hospital, the governors of which, in recognition of his great services, presented the institution with his portrait last year. It now hangs in the hospital board room. Dr. Thursfield was at one time President of the Birmingham and Midlands Branch of the British Medical Association.

Obituary.

SIR CONSTANTINE HOLMAN, M.D.,

FORMERLY OF REIGATE.

It is with the deepest sorrow that we have to record the death of Sir Constantine Holman, which occurred at Ramsgate on August 18th. To those who had seen him within the last few weeks the news could hardly have been unexpected; nevertheless, it came with the shock that must always be caused by the sudden removal from the scene of a man whom one had known for many years in the fullness of an activity which showed itself in many directions. Sir Constantine had virtually retired from practice for several years, and lived at 26, Gloucester Place, Portman Square. Till the very end, however, he continued to take a keen interest in all matters relating to the profession to which he had given so many years of self-sacrificing devotion and the benefit of an unusually large experience of affairs.



Sir Constantine Holman.

Constantine Holman was born on October 23rd, 1829. He was the son of the late Henry Holman, of Hurstpierpoint, Sussex. In 1847 he was apprenticed to Messrs. Thomas and Peter Martin, surgeons, of Reigate. The example of Mr. Thomas Martin had a great influence on his life, and while he was still *in statu pupillari* he helped that gentleman in furthering the development of the British Medical Association, and in the promotion of other schemes for the interests of the profession and the welfare of the public. In 1848 he acted as Assistant Secretary to Mr. Martin at a meeting held in Hanover Square Rooms in favour of Poor Law medical reform. In the same year he was Assistant Secretary to Mr. Martin at a meeting of the South-Eastern Branch of the British Medical Association held at Tunbridge Wells. In 1848, too, he was Assistant Secretary to Mr. Martin in carrying on the work with the Surrey Medical Benevolent Society, which was founded in 1812 to relieve the necessities of medical men in Surrey. It was at a meeting of the members of the society that Holman first met the founder of Epsom College, Mr. Propert, who had come down to negotiate the purchase of four scholarships by the society. The amount paid was settled by Mr. Tidd Pratt, then Registrar of Friendly Societies. It is noteworthy that from its foundation in 1812 to 1904 there were only three presidents or secretaries of the society, namely, Thomas Martin, Peter Martin, and Constantine Holman, who was Secretary for fifteen years and President for thirty years. He resigned that office owing to failing health in May, 1909.

In 1849 Holman entered as student at Guy's Hospital, where he was clerk to Aston Key and dresser under Cock. As clerk to Dr. Hughes, Assistant Physician, he reported the first twenty-one cases of differential diagnosis of functional and organic diseases of the heart. In 1849 he gained the Pupil's Physical Society Prize for reports of cases and a paper on struma. After studying for a time at Edinburgh he took the degree of M.D. at the University of St. Andrews in 1851, being admitted a Member of the Royal College of Surgeons of England in the same year. After spending some time in Paris in 1852, he became a Licentiate of the Society of Apothecaries in 1853. In the same year he settled in practice at Reigate. There for many years he was a member of a firm whose practice extended over a large area. As a practitioner he was sound and judicious, and it is a misfortune to mankind that, as in so many like cases, much invaluable experience has died with him. It is easy to understand that a man amid all the work and care of a busy practice should seldom find time to record his experience; nevertheless it is an irreparable loss to the profession. The practitioner who has the opportunity of observing a number of families and individuals from the cradle to the grave must necessarily accumulate knowledge as to what is vaguely but conveniently called "constitution" such as is seldom gained by the pure consultant. He learns how to deal with difficult situations for which hospital training cannot prepare him and which do not often occur in the practice of the consultant. He has to meet emergencies that tax his resource and nerve to the uttermost without the appliances and the skilled assistance which the hospital physician and surgeon has always at hand. Constantine Holman was a fine example of the general practitioner, that class which is the backbone of the medical profession. He had quite sufficient work in the way of his profession to make up a full life; but his range of interests was too large to leave him content to go his rounds and leave the task of improving the condition of the profession to others.

As has been said, almost from the first day of his apprenticeship his interest was aroused in public questions relating to medicine. In 1852 he became a member of the British Medical Association, in the conduct of which he was destined to play an important part. He took an active part in subdividing Surrey, Kent, and Sussex into their six Parliamentary Divisions for the clinical work of the Branch. In 1862 he was elected Joint Secretary of the Branch, and in the following year, after the death of Mr. Peter Martin, he was appointed full Secretary. The task of organizing the subdivisions and getting them into full working order was a heavy one; he had often to attend Council meetings at Birmingham as representative of the Branch, leaving home at 7 a.m., and returning at 1 a.m. on the following day. He was not less active in the business of the Association in general. He was a member of the

Committee of Council, then twenty-one in number. He was one of those who urged the removal of the central offices to London, where its first local habitation was in Great Queen Street, Lincoln's Inn Fields. He also gave his support to the suggestion of the late Mr. Fowke, in the face of a strong opposition, that the Association should print its own journal. The proposal was finally carried at a special general meeting held at Birmingham. Dr. Holman was Secretary of the South-Eastern Branch for five years, and he was its President in 1869–70. He was a strenuous advocate of the abolition of the old Committee of Council on which he had served so long, and of the adoption of the principle of direct representation of the Branches on the Council. When, owing to the expansion of the work of the Association, larger premises were required Dr. Holman took part in acquiring new offices in the Strand, near Somerset House. Within a few years further growth made another removal necessary, and this time the head quarters were shifted to 429, Strand. Dr. Holman, who was a member of the Premises Committee, was a strong advocate of the purchase of the site and building. At the Annual Meeting held in Dublin in 1887 he was elected Treasurer. It was a time of storm and stress, and the office of Treasurer called for the exercise of both tact and firmness. Dr. Holman took an active part in promoting the scheme for army medical reform which had been formulated at the Dublin meeting; he was an active supporter of Dr. Stewart, whose committee had given a great impetus to the progress of State Medicine, and he rendered valuable help to Dr. Waters, of Chester, in the promotion of the Medical Acts Amendment Bill. Later, he was Chairman of the Reference Committee. On that committee was imposed an irksome and thankless duty, and the chairman did his part in the work often at considerable personal inconvenience. He was elected a Vice-President at the Birmingham meeting and was awarded the gold medal of the Association in 1904, "for his distinguished services to the British Medical Association through the South-Eastern Branch, on the Central Council, and as a Vice-President," and "further for his life-long and successful labours for the improvement of the financial condition of the medical charities."

These words, which might well form his epitaph, show that the work which Dr. Holman did for the Association by no means exhausted his zeal for the interests of the profession. As a member of the council of the Obstetrical Society of London he took an active part in advocating the formation of the examining board for midwives. He was a member of the Board of Management of the Ventnor Hospital. At that time the hospital was managed by a board sitting in London, while another sat in Ventnor. Dr. Holman urged that the two boards should be in closer touch, and it was accordingly arranged that the London members should visit the Isle of Wight at stated intervals. His insistence on improvements in the dietary and ventilation of the hospital brought him into collision with some of his colleagues; feeling his position untenable, he resigned his seat on the board.

Of all his public work nothing was nearer to Sir Constantine Holman's heart than Epsom College. In 1887 the school had fallen on evil days and reform was urgently called for. He had been a member of the council of the college for some years, when in 1887 he was appointed Treasurer. The strain of the two offices of Treasurer of the British Medical Association and Epsom College would have been too great for any ordinary man, but Dr. Holman managed to discharge the duties of both offices efficiently. When he was appointed Treasurer of Epsom College there was a large deficit, and the discipline of the school left much to be desired. Owing largely to his efforts, seconded by a very efficient council, the finances were brought into a satisfactory state, and the tone and efficiency of the school were greatly improved. During his period of office as Treasurer, which extended from 1887 to 1906, a better system of accounts was introduced, a rifle corps and a fire brigade were formed, a cricket pavilion was built, the playing fields were extended, the swimming bath was enlarged, the drainage of the college was renovated, a laundry was built and equipped, 15 acres of freehold land was purchased, the chemical laboratory and lecture theatre were extended, and many other improvements were made. The college was recognized as a school of science by the medical licensing bodies. The foundation stone of the Lower School was laid by the Prince of Wales accompanied by the Princess of Wales and Princess Victoria. The following extracts, from the farewell address which he gave on resigning the office of Treasurer of Epsom College in 1906, will serve to show what was accomplished during his period of office: "Half a century is a large slice out of a man's life, and it is fifty-one years since, at a meeting of the Surrey Medical Benevolent Society, I took part in the negotiations with Mr. Propert for an advance of £2,500 to be applied towards the initiation of Epsom College, in return for certain scholarships in perpetuity which the society was to receive. Even before that time I had been engaged in work for the South-Eastern Branch of the British Medical Association. Thus I can say that for considerably more than fifty years I have taken an active part in the public life of the profession, and for forty-one of those years I was engaged in a large general practice. . . . The duties of the office of Treasurer to Epsom College carry with them heavy responsibilities, and I may be allowed to say that I have always looked upon everything

that seemed to come within the sphere of those duties as a matter of grave importance. The Treasurer's burden does not grow lighter, and I had reluctantly to come to the conclusion that it must be transferred to shoulders less bowed by the weight of years. I should not have resigned an office which I have held with great pride for nineteen years had I felt any longer equal to a strain which must increase as the power to bear it diminishes.

"The experience gained as a member of the Council of the British Medical Association, on which I served for nearly forty years, was most valuable to me in my work at Epsom. That experience led me, on my appointment as Treasurer, to institute Committees—School, Finance, Selection and Works—among which the labour of administrative work was divided. These committees, composed of picked men of the council, made inquiries, and threshed out questions that had to be dealt with; their reports were printed and circulated among the members of the council who then had the opportunity of making themselves fully acquainted beforehand with every subject which was to be considered at their meetings. So well has this system worked that I can hardly call to mind an instance in which any important amendment has been moved at a meeting of the council.

"I have not had an easy time as Treasurer. The water supply for a long time caused much anxiety and frequent expense; I hope the matter is now settled for all time. The bursting of the bath led to the discovery that it had never had a proper bottom; it cost us £1,100 to put this right. Last, but not least, came the almost crushing calamity of a breakdown in our drainage, on the renovation of which we had to spend no less than £8,000. This expense has been paid, but only at the cost of selling almost all our realizable securities.

"Fortunately there is a brighter side to the picture, and on this I ask you to look with gratification at what has been done, and hope of even better things for the future. You have 27 more acres of freehold land than you had twenty years ago; you have a lower school in full work, with accommodation for more pupils, and you have a fully equipped chemical laboratory and lecture room. In 1887 we had 191 pupils; there are now 254, which so far is our high-water mark; we are, I think, justified in believing that the increase is at least partly due to the elimination from the title of the word 'Benevolent,' which gave rise to the mistaken notion that Epsom College was a charity school. The decision of the council to encourage the attendance of day boys was carried unanimously. Although it was the wish of our founder to attract such boys, hitherto there has been no opportunity for boys coming from any distance. . . .

"It has always been a pleasure to me to keep in close touch with the teaching staff and the principal officers of the college. Needless to say, many little clouds which are, it may be, no bigger at first than a man's hand, but which will darken the heavens if allowed to grow, may be dissipated by a word spoken in season. The teaching staff are a splendid body of men whose whole heart is in their work; for proof of this one need only look at the scholarships and distinctions won at the hospitals and at the universities by those whom they have trained. Of the three matrons, I can only say in homely phrase that they would be hard to beat. The reformations wrought by the college matron have been of the highest value; Miss Brown, our lower school matron, who plays the part of a mother to fifty small boys, is beyond praise, whilst Miss Hassall, who has for sixteen years been the infirmary matron, has never failed us in times of great difficulty, and has earned the gratitude of many an anxious parent. Mr. Lamb, whom our council know and trust, I have much to thank for, and I cannot say enough in acknowledgement of his help. I cannot conclude without referring to the incorporation of the asylum into the school premises at a rental, whilst the aged pensioners with augmented annuities can live where they please, and pass their last years amongst friends and relations. I have heard of nothing but satisfaction at this change.

"A word about the council itself may not be out of place here. I have often wondered whether the governors in general have estimated at its true value the strength of the present council of the college, to the formation of which have gone infinite care and patience. That the body contains within itself all the elements that make for efficiency will be made apparent by a study of its composition and the balance of its parts. The council consists of leaders of the profession, teachers in the great medical schools of London, representatives of the provinces whose position entitles them to the respect and confidence of their fellows, old Epsomians, and two or three gentlemen of note outside the profession. In Sir Arthur Watson, Bart., K.C., Chairman of the Middlesex Hospital Committee, we have now a most valued member, who never fails us when we ask counsel of him in legal difficulties.

"And now, Ladies and Gentlemen, Governors of Epsom College, it only remains for me to resign into your hands the trust you placed in mine nineteen years ago. From my heart I thank you for the honour then done me. I have done my best, and I hope I have not been an altogether unprofitable servant. As for my colleagues on the council, how can I find words to express my gratitude to them, who have so long trusted me with their fullest confidence, who have been so indulgent to my many shortcomings, who have borne with all my failings, and who have been in every way so considerate to me? Old colleagues and dear friends, I can only say I thank you with all my heart!"

Although he ceased to hold office as Treasurer, Sir Constantine Holman never lost his interest in Epsom College. He lost no opportunity of serving its interests, and he was a constant attendant at its public functions. As he spoke of it even in private his eye would kindle with enthusiasm and his voice sometimes vibrate with emotion. It was fitting, therefore, that his long connexion with the college should be commemorated by an Art and Reading Room which bears his name.

Dr. Holman early joined the British Medical Benevolent Fund, of which he was a Vice-President. He was also a member of the Council of the Association for the Prevention of Consumption and other Forms of Tuberculosis, and of the Polyclinic Society. He was a member of the Council of the Clinical as well as of the Obstetrical Society; he had held the offices of Honorary Secretary and Member of the Council, and Vice-President of the Medical Society of London, and was for a time President of the Guy's Physical Society. He was created a knight in 1904, an honour which he had thoroughly well earned by his services to the medical profession.

Sir Constantine Holman was a man of stately presence and genial manner. Though a man of decided opinions and outspoken in the expression of them, he was always courteous to those who differed from him. He was in conduct, as in appearance, a fine type of the English gentleman. He was never so happy as when he had the opportunity of rendering a service to any one in whom he took an interest.

The funeral took place at Reigate on August 23rd; the Vicar, the Rev. F. C. Davies, officiated. The principal mourners were his son Mr. H. Martin Holman, his son-in-law Mr. C. W. Howard, his grandsons Mr. G. B. C. Howard, Mr. Neville Howard, and Mr. Cecil Howard, and his nephews Dr. H. C. Martin and Mr. H. A. Martin. Epsom College was represented by Sir William Church, the Chairman of the Council; Sir Henry Morris, Treasurer; Rev. W. A. Thomas, Senior Master of Epsom College, and Mr. J. Bernard Lamb, Secretary. The British Medical Association was represented by Dr Cox, Deputy Medical Secretary. The Reigate Division was represented by Dr. J. G. Ogle, its Honorary Secretary, and by its Representative, Dr. Caldecott, Resident Medical Superintendent of Earlswood Asylum. Mr. H. Howard, Secretary, and Mr. C. L. Smiles, Solicitor, of the Earlswood Asylum, in which Sir Constantine Holman took a great interest, were also present. The Surrey Medical Benevolent Society was represented by Mr. A. Napper, of Cranleigh, President; Mr. W. A. Berridge, of Redhill, Honorary Secretary; Dr. Henry Hetley, of Norwood; Dr. Gabb, of Guildford; and Mr. T. H. Martin, of Crawley. A number of local medical practitioners attended the ceremony, among them being Dr. Hetley, Mr. George Fisher of Dorking, Mr. A. R. Walters of Reigate; and Mr. J. H. Pegg of Reigate. The Rev. C. H. Weekes, Mr. W. A. Propert, Mr. W. O. Hodges, Mr. W. Hansell, Mr. R. Hansell, and Mr. A. D. Hansell were also present.

Professor Saundby writes: I am very glad to be able to add a few words of personal appreciation of my old friend and colleague. He was one of the most prominent of the

small band of disinterested and devoted friends of the Association who in the days when it had little prestige and no money laboured to lay the foundation of its present prosperity, and to whom our debt is immense. He was a most successful Treasurer of the Association, coming into office when the golden harvest for which he had worked so hard was beginning to be reaped. His fine presence, urbanity of manner, and genuine business capacity made him without a doubt in anybody's mind the right man in the right place. He was a man of fine character, and a medical practitioner of the best type—kindly disposed, much given to hospitality, and a faithful colleague and friend. May the Association never lack men like him to continue the work he did so well in the days gone by.

Medico-Legal.

STEVENS'S CONSUMPTION CURE.

In the Basingstoke County Court on July 27th an action was brought by a widow against a man named C. H. Stevens for the payment of £10 which he was alleged to have undertaken to pay if he did not cure her husband. This patient, after seeing an advertisement to the effect that the defendant offered £10 to any patient whose cure he undertook if he failed to effect it, got into communication with him, and received a circular stating that the terms were "no cure, no pay." This was followed by a letter consequent on which the patient paid over to the defendant £2 which had been given him by a philanthropic society. He commenced the treatment, pursued it for some time, but a year later died, the cause of death being certified to be pulmonary tuberculosis, acute bronchitis, and heart failure.

By way of defence to the action the defendant endeavoured to make out the words employed in his communications did not amount to a contract. In the course of cross-examination he stated that he was an unregistered lung specialist, and had studied consumption and its cure for fifteen years. By "unregistered" he meant that he was not qualified. He had not studied in hospitals, but under many doctors who were fully qualified men. Being pressed for their names he exhibited laudable scruples in respect of etiquette, but at length mentioned the name of a medical man stated to be living abroad. As for the nature of his study, it consisted, he said, in giving the cure to consumptive patients, and getting medical men to watch the cases while their recoveries were being brought about. He found the cure before he studied the subject. He discovered the cure by accident, the accident being that he got the receipt for the medicines he used from a "native quack doctor." He was not given a receipt, but was simply shown the plants used.

On the conclusion of the evidence the judge said that the case was one of grave importance to the general public, particularly at a time when the cure of consumption and kindred diseases was the subject of very serious examination and investigation on the part of all medical men throughout the world. It was a subject also of the greatest pain and trouble to all those poor people who themselves suffered from consumption or who had members of their families afflicted with the disease in its virulent form. A great number of quack remedies had been from time to time put forward, advertised, and pushed by people who in the majority of cases were wholly unqualified, who had no properly trained medical knowledge, and who in a great number of cases had been proved to be simply impostors trading upon the sad conditions which were brought about by the presence of this disease in any particular family or district. He regretted very much that there were people that could be found to prey upon the fears of people in this way by putting forward quack remedies which had in fact no merit in them and no possibility of cure, or about which they were absolutely and supremely ignorant as to whether they were any good or not, and which were simply put foward as a money-making scheme.

The judge then reviewed the evidence and having decided that the words used constituted a contract in this particular case added that nothing was more specious and calculated to deceive poor country people, who were not used to seeing printed matter, except local newspapers and so forth, than advertisements of this kind; and in the stress and distress they might be under from this disease they fastened upon it greedily, as was perfectly well known to those people who put this class of advertisement in. The terrible distress took away what power they had—and it was very little indeed—of discriminating between what was reasonably probable and what was not; and they fastened on these advertisements and scraped together their money—God knows how hardly sometimes—and sent it to these quack advertisers in the hope of averting the terrible calamity of the disease. That was perfectly well known to those people who advertised, and he was shocked to say that they traded upon it intentionally.

On application for leave to appeal being made the judge refused it, and added, "I will now say what I think and what I had abstained from doing before. I think this is an intentional and well-considered fraud. It is a scandalous thing that poor people should be imposed upon and led to part with their money and to hope that those dear to them would be cured by those processes which were nothing but quack remedies, and had not the slightest value of any kind."

A further reference to the case appears at page 563 of this issue.

MEDICAL MEN AND THEIR FEES.

The question of medical fees occupied a Hampshire jury some considerable time on August 11th, on the occasion of an inquest at Winchester upon the body of Ada Emma Cantle, aged 37, wife of a commercial traveller, of 7, Owen's Road, Winchester. Edward Vaughan Cantle, the deceased's husband, said his wife was expecting her confinement in October. On the previous Monday morning she complained of pains in the head and the heart. He sent his son for Dr. England, and his locumtenent, Dr. Scott, came in his place, and said he had better get a nurse. Witness got a nurse at the Maternity Home, who gave him a note on Dr. Godwin, as Dr. Scott could not stay. Dr. Godwin came, and after going upstairs came down and said to witness, "Are you prepared to pay me two guineas?" Witness said he was only able to pay a guinea. Dr. Godwin then left, saying five guineas was the usual fee in such cases, and subsequently sent a note authorizing deceased's removal to the hospital. Witness was unaware that if he was not in a position to pay he could get an official order, and have medical attendance free.

Florence Learmouth, a Maternity Society nurse, said such nurses were not really allowed to attend cases which were not booked up, and this was not.

Dr. Marcus Greene, house-surgeon at Winchester Hospital, said the deceased was admitted on the 8th inst., and was suffering from concealed accidental haemorrhage, which might have been caused by accident or violence. She was artificially delivered of a stillborn child, and died the same night, death being due to *post-partum* haemorrhage. It was impossible to say without an autopsy what caused the haemorrhage. The deceased took a turn for the worse after the birth of the child, and he did not think her life could have been saved had she been medically treated earlier.

Dr. Herbert James Godwin, surgeon, of Winchester, said he first heard of the case on the Monday, when he met the husband. He asked the husband if he was in a position to pay for a doctor, and why had he gone to a charity nurse. When he saw the woman he remarked to the nurse that it looked like a case of accidental haemorrhage. He then interviewed the husband, and told him it was a case for another doctor, and not a charity case, telling him that he thought he could get it done for two guineas, though his (witness's) fee was usually five guineas. It was nearly a full-time child, and no arrangements had been made for a doctor before. He had since ascertained that there were three doctors in Winchester who had attended there without payment, and it should have been a Poor Law case. The woman's pulse becoming serious in the afternoon witness ordered her removal to the hospital, where he attended her. The couple had eight months to make preparation and had failed to do so, this being the fifteenth case of the kind in which he had attended freely in Winchester without a "Thank you." All the other doctors in Winchester had to do this philanthropic work.

Dr. Marcus Greene, of the hospital, said that the *post-mortem* examination revealed old-standing heart disease, pleurisy, and consumption, any of which would be predisposing causes of haemorrhage.

When questioned by the coroner as to why he had not made arrangements for the confinement, the husband said that he had not seen any signs of her needing medical attention. Both were devoted to each other.

In summing up, the coroner (Mr. Henry White) said that it was one of that class of cases sometimes met with in which there seemed a wrong idea about, and he hoped this inquiry would stop it. The public owed a great debt of gratitude to the medical profession, who had a most responsible position to fill. Indeed the responsibility was so great that he (the coroner) thought it marvellous there were men who were prepared to run the risk doctors undertook. As reasonable people, they ought to appreciate all that the medical profession did for them, and no medical man, any more than any other business man, should be expected to do things at the beck and call of people unless he was paid or had a reasonable chance of being paid. If people were without means there were other sources of help available, and he could not help thinking that the husband had rather courted inquiry. He hoped this inquiry would clear up the minds of people that medical assistance could be obtained, however poor the applicants, and that they should not wait until the eleventh hour before obtaining a medical man's assistance.

The jury found in accordance with the medical evidence and *post-mortem* examination, and the coroner would not allow the husband any expenses.

DISMISSAL WITHOUT NOTICE.

A. engages B. with the understanding that B. is to go away for a fortnight, dating from the 15th. B. leaves without permission on the 14th, leaving no address, and does not return, or communicate with A. in any way, until the 1st of the next month. A. then refuses to have B., and the latter claims a month's salary. What is A.'s position?

*** The general law relating to this subject would appear to be as follows: An employee can be summarily dismissed for

misconduct, but in that case is entitled to any salary that has accrued due already, but not to salary accruing, but not due. Our correspondent's case is scarcely one of misconduct, and would appear to be governed by the decision in Fillieul *v.* Armstrong (7 A. & E. 557). In this case a French master returned to his school two or three days after the reassembling of the school, and it was held that it did not warrant the dismissal of the master. According to this B. would be entitled to the notice agreed upon mutually in terminating the engagement, or to the notice customary in such engagements, or in lieu thereof to his salary for that period.

LOCUMTENENTS AND RAILWAY FARES.

A CORRESPONDENT writes that he engaged a locumtenent for a week without any arrangement as to payment of railway fares. He paid the locumtenent five guineas and fare one way from Edinburgh, but the latter demands the return fare, although he left him to act as locumtenent to another practitioner in a neighbouring town, about twenty miles distant.

*** The locumtenent has been paid all that he can reasonably expect, because, in the absence of any definite agreement about return fare, his late employer is entitled to assume that the locumtenent's home is in the neighbouring town, not Edinburgh.

Medico-Ethical.

The advice given in this column for the assistance of members is based on medico-ethical principles generally recognized by the profession, but must not be taken as representing direct findings of the Central Ethical Committee, except when so stated.

ADVERTISING BY A DENTIST.

DENS.—The attention of the British Dental Association might be drawn to the advertisement of which our correspondent complains, or he might write direct to the Registrar of the General Medical Council, who would inform him of the steps necessary to bring the matter to the notice of the Dental Penal Cases Committee.

REPRINTS AS ADVERTISEMENTS.

W. B. B.—We desired to make it clear that the circulation to the profession of reprints of articles contributed to the medical press should not be considered advertising, but as everything may be abused we deemed it prudent to add the words to which our correspondent refers. We do not suggest that there is any impropriety in circulating to a reasonable extent a reprint intended to convey information respecting a new means of treatment, but this kind of material is especially liable to the abuse we had in mind and each case must be judged according to its circumstances.

TESTIMONIALS IN NEWSPAPERS.

DUBITANS.—It was customary in England not many years ago for candidates for hospital appointments to publish their letters of application in the newspapers, and copies of testimonials were sent to every governor; but in the course of time a better opinion made itself felt, and the practice has been generally discontinued. We should not, however, regard it as a professional offence where all the candidates did it, and in the case quoted it would be unfair to an individual to expect him to abstain from taking the same course as his competitors if by so doing he might injure his chances. The right course to take is to endeavour to educate public opinion so that such indecent and vulgar publicity should not be necessary.

NURSES AND PROFESSIONAL SECRECY.

COUNTRY PRACTITIONER writes to complain that a parish nurse is reputed to give information about her patients to members of her committee, and that, in consequence, matters of a delicate nature become common property and the subject of gossip in the neighbourhood. He asks whether the nurse is obliged to tell her committee matters which have come to her notice in the course of her professional work.

*** The nurse should regard herself as bound by the obligation of professional secrecy not to disclose anything which comes under her notice in the exercise of her profession, and we should hope the committee as a body and its members as individuals would refrain from putting any questions to her which would be inconsistent with her obligation in this respect.

Letters, Notes, and Answers.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

SCOT would like to know if a hydrocele could be operated on with a local anaesthetic; if so, which is the best?

G. P. writes: My daughter, aged 26, has had three sharp attacks of dry pleurisy occurring in February and November, 1909, and again at the beginning of the present month. No tuberculous bacilli can be detected in the sputa, but the recurrence of the complaint, which attacks the right side chiefly, suggests a tuberculous origin. Her residence is in a market town situated at the foot of hills, and is somewhat damp and enervating. Her doctor, who has taken most kind and assiduous pains with her case, is anxious for her to pass the winter months in a high and dry situation. I would be greatly obliged if any reader could recommend a well-situated residence. As the husband of the lady has daily duties in London (city), the locality should be fairly accessible to town. Brighton has been mentioned but it is an hour's ride by the best trains. Would the breezy upper parts of Lewes be suitable? Redhill has also been suggested. The importance of this consideration must be obvious.

ANSWERS.

IMPERFORATE NIPPLE.

W. A. W. had better let the breast alone till after delivery. There may be no trouble.

INSTITUTION FOR MENTALLY DEFICIENT BOY.

T. G. M.—There is no special institution which would receive a mentally deficient child of two and a half years at 5s. a week. If application were made to the Medical Superintendent of the Royal Albert Institution at Lancaster he might be able to indicate some married nurse (trained in institution methods) who might privately undertake the care of such a child in her family.

EAR PHONE FOR THE DEAF.

VICTORIAN.—The following extract from the latest edition of the *Cautionary List* issued by *Truth* deals with the question raised. The extract appears in a section headed "Medical Quacks."

> Hoffmann, Professor, 54, Duke Street, Grosvenor Square, London, W. The name used by the Shandon Sales Company, Limited, to advertise "Ear-phones" described as "Wireless Telephones," but are, in fact, simple rubber appliances worth only a few pence. The Shandon Sales Company asks £1 1s. for a pair at first, but will accept 10s. 6d. (Vol. 65, p. 1377; vol. 66, pp. 494, 844, 1098.)

The references are to issues of *Truth* in which the claims put forward have been examined. Real telephone aids for the deaf can now be obtained from Acoustic Patents, Limited, the Stolz Electrophone, and other firms, and when care is taken in choosing a combination of receiver and transmitter suited to the particular case are commonly found of very great assistance.

ELECTRICITY FOR MEDICAL PURPOSES.

"SPARD" asks for information as to the practical use (if any) of a Wimshurst electrical machine and Leyden jars for medical treatment. He also asks to be referred to a work on the subject.

*** The value of the Wimshurst machine in medicine depends upon its size and the number of its plates. For ordinary therapeutic purposes a static machine with eight or ten revolving plates is sufficient. The arrangement of static machine and Leyden jar has many applications, and American electrotherapeutists lay stress upon the value in the treatment of sciatica of the static-induced current thus obtained. In Morton's method of "static induction" Leyden jars are connected to the two poles of the machine and their outer coatings are attached to connecting cords and ordinary pad electrodes, which are applied to the skin and muscles in the same way as faradism. The treatment is valuable in muscular affections, and the static "breeze" or indirect spark application is also employed for the relief of acute muscular pains. The uses of the static machine with Leyden jars are dealt with exhaustively in Dr. Sinclair Tousey's recent work, *Medical Electricity and Roengten Rays* (W. B. Saunders Company), but a smaller book of much lower price, such as Dr. Wilfred Harris's *Electrical Treatment* (Cassell), which devotes a chapter to these static applications from the special point of view of the user of the Wimshurst machine, will probably answer the purpose of the inquirer. The technique requires a great amount of care, and static applications should not be given without a proper knowledge of the subject.

TUMULTUOUS FETAL MOVEMENTS.

DR. H. J. THORP (Ipswich) writes: In reply to your correspondents as to the treatment of tumultuous fetal movements, I would suggest the following: Sod. brom. gr.xx; tr. sumbul ʒss; tr. lupuli ʒj; Aq. camph. ʒjss; ft. haust; to be taken at 11 a.m. and 9 p.m.

LETTERS, NOTES, ETC

THE Universities' Mission to Central Africa is anxious to secure the services of a medical man willing to go out to Nyasaland for a period of not less than two years. He would receive in return passage out and home, outfit, board and lodging, and, if necessary, a salary. His duties would be the medical care of the staff, the superintendence of the hospitals, and the visiting of patients, both European and native. There are seven nurses at Nyasa, and small hospitals or dispensaries at each station; at Likoma, the central station, the out-patients in the year 1908 numbered 37,268, while 376 cases were treated in hospital. The medical man would be regarded as in every way a member of the staff, and no one would be happy in such a position who was not a communicant member of the Church of England and in general sympathy with the aims and methods of the Mission. Communications on the subject should be addressed to the Rev. D. Travers, Universities' Mission to Central Africa, 9, Dartmouth Street, Westminster, S.W.

HEARTS OF OAK SOCIETY.

A. A. M. writes: In reference to the Hearts of Oak Society, in which medical attendance is *not* provided, it is usual for the members living in large towns to combine and have a medical aid club, to which one or more medical men are appointed medical officers.

ST. PAUL'S "THORN IN THE FLESH."

DR. F. D. WELCH (London) writes: In my last letter I left out some words, and the sentence should have read "a prisoner, on the cross and dead for three days." The opinion about the blindness remains the same. I cannot agree with Dr. George Jones's statement that St. Paul apologized. Ananias offended against man's law, and at the same time offended God and Christ, and the former must have been obvious to all present, Jew and Roman. St. Paul saw his best way was to attack Ananias for offending God and Christ, and his wisdom in continuing this line of attack is shown by the fact that in the confusion of the Jews which followed he successfully turned Pharisees against Sadducees. The Lord praised him for his gallant fight, and Lysias, the chief captain, when he saw St. Paul victorious in the religious battle, did all he could to help him. The Epistle to the Galatians requires much deep thought, and some sentences cannot be taken literally, and "plucked out your own eyes" is one these. Some people think that St. Paul meant his own eyesight was defective, and the Galatians, noticing this, said they would exchange eyes with him if such had been possible. There can be no doubt that some of the Galatians had eyes the sight of which was partly or completely lost from disease or accident, and consequently of little use to themselves. Take, for instance, the case of a Galatian with congenital cataract; I think it is perfectly obvious that St. Paul would have come off *very badly indeed* in such an exchange. I interpret ch. iv, v. 13–15, as follows: "Ye know how because all are sinners I preached Christ unto you at the first. And ye were tempted to despise me as a sinner, but ye did not, nor reject me; but received me as an angel of God, even as Christ Jesus. Where is then the joy of sins forgiven ye spake of? For I bear you record that you were willing to make all possible self-sacrifices for me *worthy to be compared in their great value to good eyesight.*" I think every one will admit that good eyesight is most valuable, and when eyesight is lost that most of the usefulness and pleasures of life are lost at the same time. In ch. vi, v. 11, St. Paul says: "I have written unto you with mine own hand." Now, if his sight was defective, surely he would not write himself but one of "the brethren" mentioned in ch. i, v. 2, would have written for him. This statement of his appears to me strong evidence that his eyesight was good; and he says in the same verse "with how large letters," by which he means that the Galatians could have no excuse for refusing to read this epistle, condemning their recent actions in places, on the ground that his writing was so small and that the letters ran into one another so much that it was impossible to read it. I certainly cannot accept these sentences in Galatians as evidence that St. Paul's eyesight was defective. Quite recently I have, from studying the New Testament, formed the opinion that the "thorn in the flesh" was severe headaches following head injuries. We read in Acts, ch. xiv, v. 19, that in A.D. 46 the Jews "stoned Paul," and the words "supposing he had been dead" show that the stoning was exceedingly severe. It is clear that St. Paul had severe concussion of the brain, and this must have left much headache afterwards, and there was probably also neuralgia left from bruising of the nerves. The headache would return in times of mental anxiety and hot weather, and the neuralgia in cold weather. The news in A.D. 58 that the churches of Galatia had rejected Christ must have caused St. Paul intense sorrow, and this news, with the recollection that the stoning took place at Lystra, in the Roman province of Galatia, made the headaches much worse. On three occasions between A.D. 58 and A.D. 60, when II Corinthians, ch. xii, v. 7, was written, these headaches equalled the worst ones in meningitis, cerebral tumour, and some other brain diseases. St. Paul's words, "the messenger of Satan to buffet me," agree very well with the original cause of the headaches, which was the stoning by the Jews.

THE CAUSATION OF SEX.

DR. MARTINDALE WARD (Twickenham) writes: The correspondence appearing in the JOURNAL concerning "the causation of sex" induces me to propound the following theory: The sex is determined by the preponderance of desire at the time of coitus. Thus if the man has the greatest desire his desire is for the female form. If the woman's desire is the strongest it is for the male form, and a male child is the result. Nearly fifty years of practice has impressed upon me many facts in support of the above theory, which I have often spoken of, but never put in writing, and I should very much like my medical friends to think it out and work it out according to what they know or suspect of the natural desires of their patients and friends. I would put forth the following facts in support of my theory: (1) Many more female children are born than male. Are we not most of us convinced that as a rule the man is active, the woman passive? (2) A family perhaps consists mostly of daughters; where a boy comes in conception generally coincides with a time of weakness or illness of the man. (3) A man who is very amorous will perhaps for years have only daughters. In course of time he will become stale, and then his wife will present him with sons. (4) An old man is overwhelmed with the necessity of having a male heir; he marries a hearty, warm-blooded girl, whose real sexual desires are much greater than his own, and the result is a boy. (5) A poor specimen of a man marries a strong minded female, and the world wonders how he found the pluck to propose; presently she has a son. I could multiply such coincidences *ad infinitum* out of my own experiences, but I want rather to set your readers thinking if such is not their experience also, and if so, I will ask others to explain *how* this happens and content myself with asserting that it does happen, and then I would conclude with this corollary: If a child of one sex is desired, the desires of the parent of the *same* sex must be weakened, while we strengthen and intensify the desires of the sex we do not want.

SHIP SURGEONS.

DR. THOMAS DUTTON (London, W.) writes: In answer to inquiries, the second edition of *Sea Sickness Treatment and Prevention*, with a chapter on "Ship Surgeons," is out of print. I will lend any one the author's copy. I believe there is a copy in the library of the Association. No doubt the matter *re* a proper instituted "Medical Mercantile Marine" went home, as the leading shipping companies boycotted the book (only, I think, on the score of expense). I shall be happy to help in any movement to improve the service. It is quite incomprehensible to me why the travelling public have not insisted before now in having experienced qualified men on board, when any sudden illness of a grave nature may take place when they are thousands of miles from land.

THE MEDICAL MUSEUM.

THE review of the contents of the Medical Museum, which commenced on page 237 of the SUPPLEMENT to the issue of the JOURNAL for August 6th, should have included the following passage:

The photographs and plates by which Drs. Stopford Taylor and R. W. MacKenna supplemented their wax casts numbered over sixty. Among them were three plates illustrating adenoma sebaceum in father, son, and daughter, the disease in each case being seemingly congenital; a case of favus contracted from contact with infected bedding, and one of the rare condition known as granuloma annulare coming on in a child aged 9 after scarlatina. An even rarer disease illustrated was that in which the patient shows a tendency to blister on very slight injuries, epidermolysis bullosa hereditaria; there was also a good case of chlorine acne, the distribution coinciding very precisely with the area of the patient's body left uncovered when at work, and sebaceous cysts, regarded sometimes as a characteristic accompaniment of the condition, being numerous. The whole exhibit was very interesting and instructive.

THE FUTURE OF THE ASSOCIATION.

A Correction—In the letter from Dr. A. Walker which was published under this heading in the JOURNAL of August 20th, p. 491, the sentence at the end of the first paragraph, "probably 50 per cent. of them have never read the Draft Charter, etc.," should read "25 per cent." In the ninth line from the beginning, "delusions of mental obtuseness" should read, delusions *or* mental obtuseness.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Eight lines and under	0	4	0
Each additional line	0	0	6
A whole column	2	13	4
A page	8	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste Restante* letters addressed either in initials or numbers.